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Public Comment Draft

Montana Nonpoint Source Management Plan:

A Watershed Approach

April 4, 2001

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CHAPTER 1
INTRODUCTION

1.1 MONTANA'S WATER QUALITY AND NONPOINT SOURCES

More than 25 years ago Congress passed the Clean Water Act. The goal of the 1972 law was to make the nation's waters "fishable and swimmable" by 1984. The nation has made considerable progress in improving water quality through the control of point source pollution from industrial and municipal discharges. Today point source pollution in Montana accounts for only 10 percent of water quality impairment of streams and 20 percent of lakes.

Our challenge in the years ahead is to protect and restore water quality through the management of nonpoint sources of pollution. Montana's lakes, rivers and streams are impaired by grazing, logging, farming, mining, land development and many other activities. Sixty percent of the assessed rivers and streams fail to meet water quality standards. Nonpoint sources of pollution impair over 549,000 lake acres.

In 1987 Congress added Section 319 to the Clean Water Act. Section 319 requires states to 1) assess water bodies for nonpoint source (NPS) impacts, 2) develop nonpoint source management programs, 3) implement those programs, and 4) report biennially on NPS implementation to the U.S. Environmental Protection Agency (EPA).

It has been almost a decade since the Department of Environmental Quality revised its nonpoint source management plan. The 1991 plan described the state's existing programs and authority for addressing nonpoint pollution problems. In the intervening years the legislature amended Montana's Water Quality Act to include the development of Total Daily Maximum Loads (TMDLs); the federal government announced a new Clean Water Action Plan and the Department of Environmental Quality began moving toward a *watershed approach* to address nonpoint pollution priorities.

1.2 NINE KEY ELEMENTS OF AN EFFECTIVE STATE NPS PROGRAM

EPA has established evaluation criteria that consist of nine elements that a State Nonpoint Source Program must include in order to demonstrate that it has developed an effective state program. The elements are as follows:

1. Short- and long-term goals that define measurable milestones of the state's nonpoint source program vision.

2. Demonstrate the capability to establish working partnerships with local, tribal, state, and federal entities, and citizen groups to achieve program goals.

3. Maintain a balanced program that employs both a statewide nonpoint source program and on the ground management of individual watersheds, especially where waters are impaired or threatened.

4. Establish priority setting criteria that allow the program to identify known water quality impairments, and prevent water quality degradation from present and future nonpoint source activities.

5. Use a unified and comprehensive assessment program that promotes collaboration with other agencies and programs and coordinates the use of grants and other implementation tools.

6. Develop the capability to use and update a range of approaches (e.g., regulatory and non-regulatory; water quality-based and/or technology-based; technical and financial assistance).

7. Evaluation of federal lands and activities to ensure that they are managed consistently with state nonpoint source program objectives. Where appropriate the state will work with EPA to resolve issues.

8. Program management that efficiently and effectively implements the state's nonpoint source program, including all necessary financial management.

9. Incorporate the principles of adaptive management to review, evaluate, and update the nonpoint source program's environmental and functional measures of success at least every five years.

The proposed watershed approach is a means of fulfilling each of the elements. It is the goal of this document to describe how each of the above categories and elements are addressed in Montana's Nonpoint Source management program.

1.2 NPS Plan Objectives

Support Local Conservation Activities: The NPS Management Plan is based on the premise that water quality solutions must be developed and implemented with the support of citizens who have an acknowledged interest in the watershed. The department plays an important role in supporting local conservation activities. DEQ has structured its NPS program to assist local watershed groups. Planning and monitoring staff are assigned to help specific watershed groups within the state's four major basins (Columbia, Yellowstone, Upper Missouri and Lower Missouri). DEQ's Information and Education program helps publicize local watershed efforts and facilitates communication between watershed groups and other public agencies and private organizations.

Complete Comprehensive Assessments: Using watersheds as a management area increases DEQ's ability to collect and utilize information to prepare *comprehensive assessments* of the state's watersheds. Comprehensive assessments explain the complex interactions between land use practices, pollutant loads, watershed processes and water body conditions. DEQ will create standard procedures for pooling information from numerous sources on a watershed basis. Geographic Information Systems, such as an interactive watershed website being developed by the Natural Resources Information System, are one tool that can be used to develop a common data base for management activities planned or underway in a watershed.

Improve Collaboration with Other Programs, Agencies and Organizations: A watershed approach strengthens existing intra-agency and interagency coordination and targeting of resources. DEQ's Watershed Management Team (WMT) is an example of a intra-agency collaborative effort. (see page 3-11). The Watershed Coordination Council is the primary interagency coordinating group in Montana (page 3-14). DEQ's watershed planning and monitoring staffs participate in the council's workgroups.

Improve Connection Between Assessment, Planning and Implementation: A watershed approach will accelerate the trend within DEQ to link assessment and planning information to implementation grants. The TMDL program requires an explicit numeric connection between sources, impacts and control measures. This can only be achieved with integrated assessment, planning and implementation. DEQ will give priority to grant applicants who show that their planning process is supported by comprehensive environmental assessments. To better serve the information needs of local watershed groups, DEQ will allocate a portion of its resources to a monitoring program that targets selected watersheds each year.

1.3 A Watershed Approach for NPS Impairments

Water quality restoration requires dozens of individual decisions and actions. To restore and protect water quality people not only have to change the way they *do* things, they often have to change the way they *think* about things— about the land, water and the world around them.

Most of the time an individual land owner's actions won't have a measurable impact on water quality (unless it is a large landowner in a small watershed). It is often frustrating for landowners to make extra investments in soil and water conservation measures while their neighbors do little or nothing. For twenty-five years nonpoint source programs had little quantifiable impact on water quality because individual efforts were dispersed across many watersheds.

Montana's watershed approach relies on grassroots groups developing voluntary approaches to restoring water quality. The federal 1998 Clean Water Action Plan also emphasizes local watershed planning and increased collaboration between federal, state, tribal, and local governments, the public; and the private sector.

Managing water resource programs on a watershed basis makes sense – for the community, the state and the environment. The watershed approach enables communities to develop water pollution solutions that mesh with local economic and environmental realities. Local watershed planning relies on the knowledge, wisdom and experience of ranchers, farmers, foresters, recreationists and public employees who understand the watershed. Because local people are involved in developing the plan, they have a vested interest in its success. Bringing citizens together to proactively address issues reduces conflicts. As a critical mass of the community commits to the plan, watershed protection will become a community value. The watershed approach is especially suited to rural Montana where there is an historic tradition of developing community responses to local problems.

Montana is the fourth largest state in land mass but ranks 44th in population. It ranks third in the number of stream miles (176,750 miles), sixth in the number of lakes (10,246) and eighth in total lake acreage (844,802 acres). Due to its small population and tax base Montana has a relatively small state government and limited resources for addressing water quality issues at the state level. A coordinated watershed approach allows DEQ to leverage its resources through cooperation with other government agencies, private groups and volunteers in monitoring, data collection and water quality restoration. Broad-based collaboration and communication also prevent duplication of efforts. Because federal agencies such as the Forest Service, Bureau of Land Management and Natural Resources Conservation Service fund programs on a watershed basis, this approach may increase funding for Montana watershed projects.

1.4 Summary of Major Changes to the NPS Program

From 1989 to 1997 DEQ built a comprehensive NPS program that developed Best Management Practices, identified key partners, established agreements for interagency cooperation and funded many successful education, protection and restoration projects. The NPS program was first managed by the Department of Health and Environmental Science (DHES). In 1995 the NPS program was transferred to the newly created Department of Environmental Quality. DEQ staff developed local government contacts and participated in numerous watershed group sponsored projects. This early period of NPS management in Montana fostered a keen understanding of the value of collaboration, consensus and community involvement in water quality management (see Table 1-1).

The TMDL Amendments to the Montana Water Quality Act: The 1997 amendments to the Montana Water Quality Act require DEQ to monitor and assess surface waters and prepare a list of lakes, streams or segments of streams that do not support "beneficial uses." Beneficial uses include drinking water supply, recreation, industry, agriculture, wildlife, fish and aquatic life.

The department is instructed to use "all currently available data... from federal, state and local agencies, private entities or individuals" in making its assessments. The law allows DEQ to remove a water body from the list due to a lack of "sufficient credible data" to support its listing. However, DEQ is required to monitor and assess the delisted water body "as soon as possible."

The 1997 law requires that water quality restoration plans for all threatened and impaired water bodies be completed by 2007.

DEQ prioritizes impaired or threatened water bodies using these criteria:

1. the established beneficial uses (for example, not every lake and stream is expected to support trout)
2. the extent that natural factors over which humans have no control contribute to the impairment;
3. the impacts to human health and aquatic life;
4. the degree of public interest and support;
5. the character of the pollutant and the severity and magnitude of the problem;
6. whether the water body is an important high-quality resource in an early stage of degradation;
7. the size of the water body;
8. immediate programmatic needs, such as waste load allocations for new permits or permit renewals
9. court orders and decisions relating to water quality;
10. state policies and priorities, including the protection and restoration of native fish;
11. the availability of technology and resources to correct the problems;
12. whether actions or voluntary programs that are likely to correct the impairment are currently in place;
13. the recreational, economic, and aesthetic importance of a particular water body.

Threatened or impaired water bodies are classified as high, medium or low priority for developing water quality restoration plans. In setting priorities DEQ relies on a TMDL advisory group. This state-wide committee represents farming, ranching, water-based recreation, the forest industry, environmental organizations, municipalities, mining, federal land agencies, the Department of Natural Resources and Conservation, point source dischargers, conservation districts and recreation interests.

Federal and state laws direct DEQ to develop *Total Maximum Daily Loads* for all impaired water bodies. A TMDL is the total amount of pollution that a waterbody may receive from any source without exceeding water quality standards. A TMDL calculation includes a margin of safety and accounts for seasonal variations and contributions from all point, nonpoint and natural sources.

Water quality restoration plans establish targets to gauge success in meeting water quality standards and restoring beneficial uses. Targets are specific and quantifiable whereas goals are general statements of intent or purpose. For example, the goal of a watershed plan might be "the restoration of a cold water trout fishery." The plan's targets, which are directed at achieving the goal, might be 1) reducing sediment by 50 percent; 2) increasing redds (fish spawning nests) by 135 percent; and 3) stabilizing 3412 feet of erosive streambank. When targets are met, water quality standards should be achieved as indicated by full support of beneficial uses. If uses are not yet supported, the targets need to be changed

Wherever possible, DEQ intends to work with local watershed groups and conservation districts to develop water quality restoration plans. Watershed groups are comprised of citizens who have an interest in the outcome. DEQ is directed to request the participation of farmers, ranchers, environmentalists and recreationists, as well as representatives of DNRC, the U.S. Forest Service, Bureau of Land Management, municipalities and the forest, mining and tourism industries. Each watershed group, however, reflects local land and water uses in the community. In order to achieve TMDL targets, point source dischargers may have their permits adjusted to reduce their contribution while nonpoint contributors will be urged to adopt a "voluntary program of reasonable land, soil and water conservation practices that result in meeting water quality standards."

The Montana Water Quality Act is oriented toward achieving results. DEQ ensures implementation by:

(a) incorporating the water quality restoration plan into its continuing planning process,

(b) incorporating the waste load allocation for point sources into appropriate water discharge permits,

(c) informing landowners about and assisting in the application of a voluntary program of reasonable land, soil, and water conservation practices to achieve compliance with water quality standards, and

(d) developing a monitoring program to analyze the effectiveness of the control measures and assess the waters to determine whether compliance with water quality standards has been attained.

If a water quality restoration plan has not restored beneficial issues within five years DEQ is required to conduct a formal evaluation to determine if:

1) the implementation of new and improved BMPs is necessary

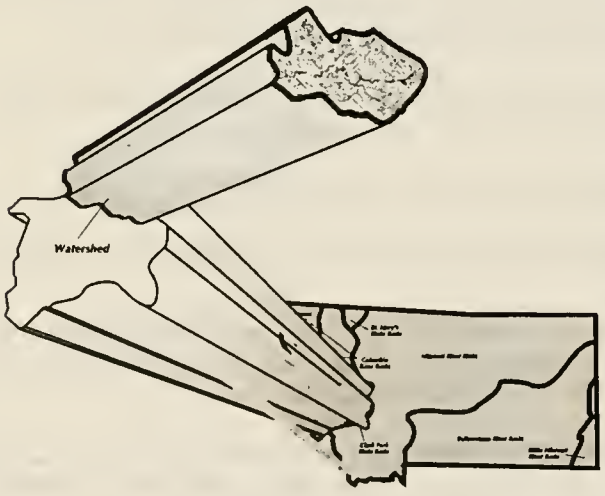
2) water quality is improving but more time is needed to comply with water quality standards; or

3) revisions to the plan will be necessary to meet water quality standards.

Other NPS Laws and Programs: Montana laws address an array of NPS and groundwater issues such as stream crossings, septic tanks, strip mines and land fills. Several state and local agencies are delegated authority to address these issues. For example, the Department of Natural Resources and Conservation enforces the Streamside Management Act; the Department of Fish, Wildlife and Parks implements the Stream Protection Act; and conservation districts administer the Natural Streambed and Land Preservation Act.. There is an obvious need to coordinate NPS activities both within the Department of Environmental Quality and between other state agencies.

The Clean Water Action Plan: In 1998 DEQ and the Natural Resources Conservation Service brought together federal and state agencies to develop Unified Watershed Assessments. The agencies identified watersheds with common priorities and opportunities for cooperation. The group developed a two year strategy based on a biennial needs assessment where converging agency and local priorities are identified. Local watershed groups provide information on program needs and the state and federal groups coordinate the search for appropriate technical and financial assistance. The participating federal agencies are the Bureau of Reclamation, Bureau of Land Management, Forest Service, National Park Service and Natural Resources Conservation Service. State agencies include Fish, Wildlife and Parks, Department of Natural Resources and Conservation, Montana Heritage Program and DEQ.

Figure 1-1 Levels of Watershed Focus



Just as a stream increases in size from the headwaters to the mouth, so the watershed planning process builds from the local watershed level to the sub-basin to the state. With technical and financial assistance from DEQ and other state and federal partners, local watershed groups participate in describing the problem and crafting the solution. Ultimately, the focus of all water quality restoration plans should be implementation by the individual land managers and waters users who impact and benefit from the resource.

Table 1-1
Montana DEQ Nonpoint Source Program Milestones

Date	Montana DEQ Nonpoint Source Program Milestones
December 1987	➢ Montana Department of Health and Environmental Sciences (DHES) initial NPS program meeting convened.
January - July 1988	➢ DHES completed draft NPS Management Plan reviewed by interagency NPS Task Force, distributed plan for public review and comment, and sponsored public meetings to receive additional input. Final submitted to Governor for approval.
August 1988	➢ DHES NPS Management Plan submitted to EPA for approval
1989	➢ DHES strategy developed and implemented to coordinate NPS monitoring and assessment activities statewide.
1989 - 1992	➢ DHES stream reach assessments conducted to identify impaired streams.
1989 – 1992	➢ DHES provides financial and technical assistance for demonstration projects on impaired streams including trend monitoring to evaluate project effectiveness
March 1995	➢ The Montana Watershed Coordination Council (MWCC) assumes responsibility for the NPS Task Force. MWCC helps in selection of NPS projects.
July 1995	➢ DHES is reorganized as Department of Environmental Quality (DEQ). DEQ is designated the agency responsible for implementation of NPS program.
May 1996	➢ EPA releases updated guidance to states for nonpoint source programs.
1996	➢ DEQ NPS Management Plan is modified to address nonpoint source pollution from landfills.
August 1996	➢ Watershed Management Team chartered to develop watershed strategy to coordinate DEQ program activities.
July 1997	➢ DEQ integrates Total Maximum Daily Loads initiative into the NPS program.
October 1998	➢ Local, state, and federal agencies develop the first annual Clean Water Action Plan (CWAP) unified watershed assessment for Montana. Priority setting process completed.
June 1999	➢ DEQ uses supplemental 319 money to fund watershed projects as part of CWAP,
May 2001	➢ DEQ solicits public review and comment on *NPS Management Plan Using a Watershed Approach* and submits to EPA for approval.
Ongoing Annual Activities	➢ Solicit and process applications for 319 grants. ➢ Work with MWCC to identify priority NPS projects. Fund 319 projects. ➢ Nonpoint source restoration projects completed, groundwater projects , and (&E projects completed. ➢ NPS TMDLs plans completed.

CHAPTER 2

STATEWIDE OVERVIEW OF NPS IMPACTS

2.1 OVERVIEW OF MONTANA'S GEOGRAPHY AND LAND USES

At 145,388 square miles— 93 million acres--Montana is a big state. Were the state's 902,195 residents spread evenly across the land, there would only be six persons per square mile. Of course, people are not scattered uniformly. Sixty percent live in just seven of the 56 counties. Thirty-six percent live in eight cities. Six of the seven most populous counties and six of the eight largest cities are located in western Montana where recent growth has been rapid. This concentration of population leaves much of the state with a very low population density.

Almost a third of Montana is owned by the state and federal government: 17 million acres managed by the U.S. Forest Service, mostly in the western half of the state; 8 million acres administered by the Bureau of Land Management and lesser acreage controlled by the National Park Service and other agencies. The state owns more than six million acres, most of it managed by the Department of Natural Resources. There are seven Indian reservations totaling 2.5 million acres. Agriculture, recreation and tourism, forest products, and mining form the base of Montana's economy. The eastern third of Montana is prairie land, part of the Northern Great Plains ecosystem. The middle third is prairie surrounding island mountain ranges. Western Montana is characterized by rugged mountain ranges and deep river valleys. Generally speaking, precipitation decreases from west to east and varies from 80 inches in the high western mountains to less than 10 inches in the northeastern plains.

Montana has been called the "Headwaters of the Continent." It is the only state that sends water to three oceans. The state is comprised of three major and two minor river basins:

- Two tributaries of the **Columbia**, the Clark Fork and the Kootenai, drain 26 million acre feet from 25,125 square miles. This basin is just 17 percent of the land area but accounts for 53 percent of the state's annual surface flow.

- Conversely, the **Missouri** and its tributaries drain 56 percent of the state, over 82,000 square miles, yet only carries 17 percent of the annual surface flow (8 million acre feet).

- The **Yellowstone** drains 36,000 square miles (24 % of the state) and carries 9.5 million acre feet (21%) to meet the Missouri just inside the North Dakota border.

- The **Little Missouri River** slips through the southeast corner of the state draining just two percent of the land area in Montana.

- The **St. Mary's River** flows north toward the Arctic Ocean from Glacier National Park, draining two percent of the water from one percent of the land.

For management purposes, these five river basins are divided into 16 major sub-basins which are further divided into 91 watershed planning areas (Figure 2-1).

Figure 2-1: 16 Major River Basins

2.1.1 Overview of Beneficial Uses of Surface Waters, the Water Classification System, and Water Quality Standards in Montana

The Montana Water Quality Act requires the Board of Environmental Review to adopt water quality standards to protect beneficial uses. The act also directs the Board to establish permit and nondegradation requirements. Surface and groundwater use classifications systems and water quality standards and criteria are defined in the Administrative Rules of Montana, Title 17, Chapter 30, Subchapters 6 and 10, respectively.

For most rivers, lakes and streams "beneficial uses" are those uses which the water body supported when the classification system was adopted in 1955. Beneficial uses can be group in three broad categories: aquatic life support, recreation and water supply.

Aquatic life includes the plants and animals normally associated with a high quality ecosystem. Fisheries use is a more focused element of aquatic life support. Aquatic life support may be impaired by chemical pollutants, sediment, riparian habitat degradation, stream channel modifications, excessive water withdrawal for irrigation and other actions that disrupt the integrity of the waterbody.

Recreation uses includes activities that involve contact with water such as swimming and boating. Recreation use may be impaired by noxious algae growth or health concerns such as fecal coliform bacteria.

Water supply encompasses domestic, municipal, industrial and agricultural uses. Low flow, excessive sediment and suspended solids and high salinity may impair water supply uses.

Aquatic life support, fisheries, swimming and drinking water supply have the highest water quality requirements. When these uses are fully supported it is reasonable to expect that other uses (such as agriculture water supply) will also be supported.

Four levels of use support describe Montana's waters:

1. **Fully supporting**: waters are at their natural or best practical condition and water quality standards are not being violated.

2. **Threatened but fully supporting**: there is a downward trend in water quality or a new activity or an increase in existing activities not using BMPs may result in violations of water quality standards.

3. **Partially supporting**: This is a broad designation for situations in which a waterbody is in the range between "slightly impaired" to "barely supporting" a designated use.

4. **Non-supporting**: a waterbody has acute toxics or human health criteria violations, where biological or physical data indicate severe degradation, or where other data indicate that water quality standards are violated and one or more uses cannot be attained.

Waterbodies are assessed for each beneficial use. A lake or stream segment might be fully supporting one use, such as industrial water supply, while only partially supporting another use, such as aquatic life.

Montana classifies waterbodies as:

A- very high quality waters suitable for public water supply.

B- suitable for multiple uses including domestic supply after conventional treatment. The B classification is divided into cold water fisheries, commonly mountain or foothill streams and lakes that support trout and associated fish (B-1 & B-2); and eastern prairie waters that typically support sauger, catfish and other warm water fish species (B-3). Most Montana rivers and streams are classified as B-1, -2 or -3.

C- suitable for all uses except drinking water; four stream segments are classified as C-1 and C-2 due to contaminates identified prior to 1955. C-3 waterbodies are naturally high in total dissolved solids.

I- waterbodies which were impaired in 1955. There are only three I stream segments and one of these, Muddy Creek in the Sun River watershed, is being restored by a local watershed group (see page 3-5).

Wetlands

Wetlands protect water quality by storing flood water, trapping sediment, filtering out pollutants and utilizing nutrients. Wetlands recharge aquifers. Many fish and wildlife species rely on wetlands including threatened and endangered species such as whooping cranes, piping plovers, and bald eagles. The prairie pothole region of the northern Great Plains provides valuable production areas for waterfowl. Montana wetlands support the tourism industry by providing fishing, hunting, camping, and wildlife viewing opportunities.

Montana classifies wetlands as waters of the state, which affords them the level of protection afforded other surface waters. The state is still developing water quality standards and a baseline inventory and tracking system for wetlands. DEQ has been appointed the lead agency for wetland management. Wetlands comprise less than one percent of the total surface area of Montana. It has been estimated that 27 percent of

Montana's wetlands have been lost since colonial times. Wetlands support the tourism industry by providing fishing, hunting, camping, and wildlife viewing opportunities.

2.1.2 Major Sources and Causes of Nonpoint Source Pollution

Section 303(d) of the Federal Clean Water Act requires states to identify waters where beneficial uses are either impaired or threatened. The state's 303(d) list also identifies probable sources and causes of impairment. The cause of an impairment is the contaminate, the source is where the contaminate came from. For example, the cause of impairment might be heavy metals. The source may be an abandoned landfill. The leading causes of stream impairments are habitat modification (bank erosion, channel incisement, riparian degradation and fish habitat degradation), siltation, flow alteration, excess nutrients, salinity, metals and suspended solids. Lakes are impaired by siltation, metals, nutrients, flow alterations, suspended solids, habitat alteration and salinity.

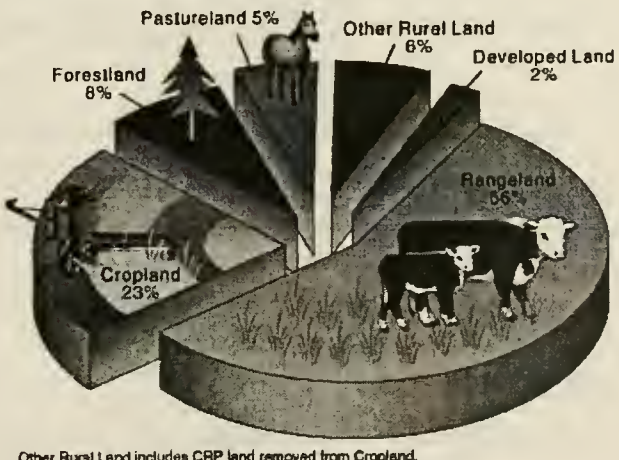
Nonpoint source pollution accounts for 90 percent of stream and 80 percent of lake impairments in Montana. More than half the land area of Montana is devoted to ranching and farming (see Figure 2-2). So it follows that agriculture is the leading source of NPS pollution (Table 2-2). Resource extraction, forestry, urban runoff, construction, septic systems, landfills and other activities also impact water quality. Save for the absence of point sources, Montana's leading sources of water pollution resemble the nation as a whole (Table 2-1 and 2-2)

Several sources can contribute to a particular impairment (Figure 2-3). For example, siltation in a stream may be the result of agriculture soil erosion, construction, and timber harvest practices in different parts of the same watershed. More detailed assessments, such as those conducted for the TMDL development process, will be required to determine how much sediment is contributed by each source and how much is from natural background sources.

Over 50 percent of Montanans get their domestic water supply from groundwater sources. Groundwater in Montana has become contaminated by some of the same causes and sources as surface waters. For example, groundwater and public water supply wells have been contaminated with nitrates, bacteria, solvents, benzene, cyanide, pesticides, and salts contributed by septic systems, industrial wastewater disposal, leaking underground storage tanks, mining, and agricultural practices.

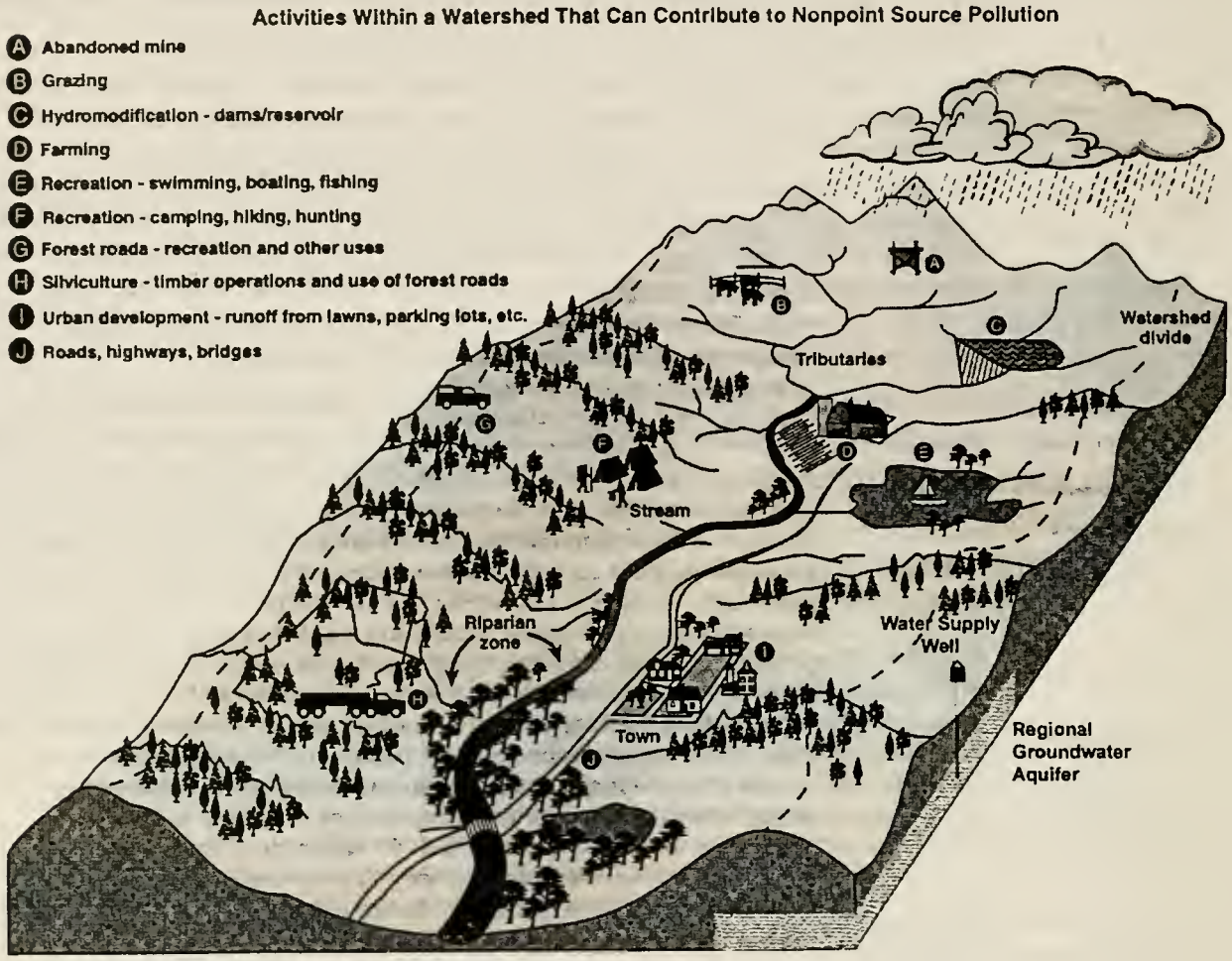
The interaction between aquifers and surface water is very dependent on local conditions. Due to the widespread dependence on groundwater for drinking water in Montana, attention to this flow exchange between ground and surface water has been increasing. Groundwater contamination has been attributed to surface water quality at two sites in Montana. Near Three Forks concentrations of arsenic increased in the alluvial aquifer after sprinkler irrigation systems replaced flood irrigation. The increased efficiency of

Figure 2-2: Montana Nonfederal Rural Land



Other Rural Land includes CRP land removed from Cropland.
Developed Land includes urban, built-up, and rural transportation.
Source 1992 National Resources Inventory, USDA Natural Resources Conservation Service.

Figure 2-3


Activities Within a Watershed That Can Contribute to Nonpoint Source Pollution
A Abandoned mine
B Grazing
C Hydromodification - dams/reservoir
D Farming
E Recreation - swimming, boating, fishing
F Recreation - camping, hiking, hunting
G Forest roads - recreation and other uses
H Silviculture - timber operations and use of forest roads
I Urban development - runoff from lawns, parking lots, etc.
J Roads, highways, bridges
Tributaries
Watershed divide
Stream
Riparian zone
Water Supply Well
Town
Regional Groundwater Aquifer

Source: GAO/RCED-99-45 Nonpoint Source Pollution

Table 2-1: Five Leading Sources of Water Quality Impairment—U.S.

Rank	Rivers	Lakes
1	Agriculture	Agriculture
2	Municipal Point Sources	Unspecified Nonpoint Sources
3	Hydrologic Modification	Atmospheric Deposition
4	Habitat Modification	Urban Runoff/Storm Sewers
5	Resource Extraction	Municipal Point Sources

Source: 1996 National Water Quality Inventory

Table 2-2: Five Leading Sources of Water Quality Impairment-Montana

Rank	Rivers & Streams	Lakes
1	Agriculture	Agriculture
2	Natural sources*	Flow modification (reservoirs)
3	Habitat Modification	Atmospheric deposition
4	Resource Extraction	Dam construction
5	Silviculture	Wastewater systems (septic tanks)

*Includes natural sources of sedimentation and heavy metals.

sprinkler irrigation probably reduced dilution and increased the concentration of naturally-occurring arsenic in ground water. At Milltown, arsenic and heavy metal concentrations in the alluvial aquifer have increased as a result of river water being pushed by hydraulic pressure through the mill tailing sediments behind Milltown Dam.

The 1999 Montana Groundwater Plan (Appendix A) presents recommendations for protecting and remediating groundwater resources and for educating the public about groundwater management. Consequently, this plan will also support groundwater management efforts within the watershed areas described in Chapter 3.

Agriculture

Farms and ranches cover two-thirds of the state— nearly 60 million acres. Thirty percent of this is cropland and sixty-five percent is range and pasture land. Agriculture is Montana's leading industry, generating $1.8 billion dollars in 1998; $934 million in crops and $865 million in livestock. Wheat is by far the leading cash crop, much of it grown in a dryland crop-fallow rotation to conserve moisture. The bulk of the farmland is east of the Rocky Mountains, although there are many important agricultural areas in western Montana.

Agricultural activities impair 11,230 miles of streams and account for 60 percent of nonpoint stream pollution. Over 370,000 lake acres are impacted by farming and ranching, 46 percent of the assessed lake acreage (see Table 2-3). Agriculture pollutants include sediment from range and crop land erosion and streambank destabilization; bacteria and nutrients from livestock manure; fertilizers and pesticides.

Farmers and ranchers operate in an unstable economic climate. The prices farmers receive for their products fluctuate widely, with broad low valleys between the occasional high peak. Meanwhile, the prices farmers pay for their inputs only seem to go up. Most Montana farmers have had to weather several years of drought and low prices. To stay in business farmers and ranchers have to be conservative fiscal managers. They can't afford to gamble on untested management practices. Only when farmers and ranchers are convinced that they can simultaneously protect water quality *and* long term profitability will we see significant voluntary results. Our challenge is to focus the rancher or farmer's attention, experience and resourcefulness on water quality problems— and to persuade farmers and ranchers to participate in the local watershed planning process. The watershed approach, with its emphasis on local planning and voluntary, proactive involvement, appeals to the agriculture community. The early success of the watershed approach is due to the leadership and cooperation of agriculture producers and their membership organizations.

TABLE 2-3 Agriculture NPS Impairments

	Miles of Stream Impact	*Lake Acres Impacted*
Non-irrigated Crop Production	1,809	14,936
Irrigated Crop Production	7,220	299,364
Rangeland	6,653	278,751
Other Ag. Sources	1,198	
TOTAL AGRICULTURE	**11,230**	**370,015**

Note: The figure for "Total Agriculture" is not the sum of the columns because a mile of stream or an acre of lake may be impaired by more than one source.

Whole Farm and Ranch Planning

Individual water quality plans for farms, ranches and small acreages can be a component of an implementation strategy for a watershed plan. Developing a water quality plan enables a landowner to look critically at how his activities impact water quality and helps him integrate best management practices into his overall operation. The water quality plan can, and probably should, be integrated into a whole farm plan that includes business management, crop rotation, animal husbandry, pest and fertility management and wildlife habitat. The water quality component of the plan might address soil erosion, irrigation management and return flows, range management, nutrient management, pesticide use and riparian area protection or restoration. It is not always possible, or even necessary, to separate water quality measures from other components of farm management. For example, reducing soil erosion (a water quality practice) maintains the productivity of the soil and the sustainability of the farm as a business.

Most whole farm plans include goals and targets. A goal is a general statement of purpose or intent. A whole farm goal might be to "sustain the productivity of the soil." Targets are specific and quantifiable: "increase soil organic matter from 1.5 to 2.5 percent;" "establish 1500 feet of riparian forest buffer." A good plan includes a timetable for meeting targets and includes a monitoring strategy for evaluating success. Equipped with some fundamental training from the Montana Volunteer Water Monitoring Project, a landowner can track the health of a stream over time. He can also use other indicators to document progress, such as photo points taken at strategic sites on the farm or ranch. Over time these photos will indicate how the land is responding to alterations of management. *Indicator species* can also be used for gauging the health of the farm ecosystem. The landowner may perform an annual or biennial census of a few wildlife species that demonstrate the land's diversity and vigor.

A whole farm plan doesn't have to be as long and complex as the Plum Creek Habitat Conservation Plan (see page 2-12). Plum Creek's staff includes foresters, soil scientists, wildlife biologists and other experts. However, a family farmer or rancher can utilize the expertise of the local conservation district, Natural Resources Conservation Service, Department of Fish, Wildlife and Parks and other resource agencies.

DEQ has no authority or desire to require farmers and ranchers to develop water quality or whole farm plans. However, for many farmers, ranchers and small landowners, a whole farm plan can be an important tool in meeting their economic and environmental goals. It can also be a tool for local watershed groups to measure progress and achieve targets. Conservation districts and watershed groups could take the lead in providing whole farm plan training to farmers and ranchers. DEQ's role would be to provide resources to local groups and publicize their efforts.

NPS Agriculture Strategy

1. Increase BMP implementation. Addressing water quality impairments on a watershed basis will increase both the implementation and effectiveness of best management practices. The focused application of conservation practices will give DEQ and its resource partners opportunities to gauge BMP effectiveness in restoring and protecting water quality.

2. Continue to seek the support, trust and collaboration of agriculture producers and their membership organizations. Montana's leading agriculture organizations are represented on the Statewide TMDL Advisory Committee and have participated in the development of

agriculture best management practices. DEQ will work with agriculture organizations to increase understanding of and support for the TMDL planning process.

3. Develop 319 contract with the Montana Farm Bureau to fund a director of water quality programs. This Farm Bureau employee will help organize watershed action groups and serve as a liaison between agriculture producers and resource agencies. He would help farmers and ranchers identify potential sources of pollution and help them obtain technical or financial assistance to address water quality problems. The contract has a special emphasis on helping farmers and ranchers comply with CAFO/AFO regulations.

4. Identify agriculture-related public information/education needs. DEQ has produced or helped fund several agriculture BMP publications including **Riparian Grazing Successes on Montana Ranches** (1995), **Guide to Animal Waste Management and Water Quality Protection in Montana** (1996). The watershed planning process will identify other public information/education needs

5. Collaborate with MSU Cooperative Extension Service, NRCS and agriculture organizations in providing resources and training in whole farm planning to farmers, ranchers, conservation districts, watershed groups and other resource agencies.

6. Encourage farmers and ranchers to take advantage of low interest State Revolving Fund loans to finance the implementation of Best Management Practices.

IRRIGATED AGRICULTURE

There are 2.8 million acres of irrigated farmland in Montana. Three percent of irrigation water comes from groundwater sources and 97 percent from surface waters. During the summer nine million gallons a day are used for irrigation. Irrigation accounts for 97.6 percent of all surface water withdrawals. Important irrigated crops include wheat, alfalfa, barley, oats, sugar beets, potatoes, corn and cherries.

Of the major agricultural activities, irrigation has the greatest impact on water quality and quantity. Many streams are impaired by low stream flows and high water temperatures resulting from irrigation withdrawals. Conversely, other streams have too much water from irrigation return flows. This happens where water is diverted from a large stream and returned to a small one. Fluctuating flows erode stream banks and streambeds and destroys aquatic and terrestrial habitat. Return flows often contain sediment, nutrients, pesticides and other pollutants. Several conservation districts and watershed groups have had considerable success in restoring water quality by improving irrigation efficiency. For example, replacing an open ditch with a pipe and converting some fields from flood to sprinkler irrigation saved enough water to guarantee late summer stream flows in the Big Creek Watershed in Park County. Historically, there was no incentive for farmers to conserve irrigation water. Water rights doctrine was pretty much "use it or loose it." However, in 1989 the law was amended to allow water rights to be leased for instream uses. The Natural Resources Conservation Service estimates seventy percent of Montana irrigation systems could use improvement in irrigation water management, on-farm irrigation systems, and irrigation water conveyance. Improved irrigation water management not only improves stream flows, it also reduces the amount of sediment, pesticides and nutrients entering Montana's surface water.

For many irrigators, energy for pumping and applying water is a major cost of production. Rapidly rising utility rates will discourage some from investing in best

management practices. High rates also dissuade conversion from flood irrigation to more water-efficient sprinkler irrigation. While high rates might encourage less water use, the unstable market might also lead some to sell their land for other uses that might have more severe water quality impacts.

NPS Strategy for Irrigated Agriculture

1. **Improve irrigation water management.** Irrigators can reduce water use, return flows and their production costs by using modern technologies to monitor air and soil temperatures, soil moisture, evaporation, relative humidity, crop water use, and other factors that influence irrigation scheduling. The Bureau of Reclamation's AgriMet system provides climatic data and crop water use information to assist farmers in irrigation scheduling and application http://www.gp.usbr.gov/agrimet/ agrimet.htm. In watersheds where irrigated agriculture has a major impact on water quantity and quality, DEQ will help watershed groups identify resources for improving irrigation water management.
2. **Invest in irrigation infrastructure.** A lot of water withdrawn for irrigation never makes it to the field–it is lost to evaporation, seepage or leaks in the distribution system. A lot of flow could be returned to rivers and streams by upgrading obsolete and inefficient delivery systems. DEQ will help watershed groups identify public and private resources for improving irrigation infrastructure.
3. **Increase Application of irrigation Best Management Practices.** DEQ will continue to work with conservation districts, watershed groups, agriculture organizations and other resource agencies in developing, refining and promoting BMPs for irrigated agriculture.
4. **Demonstrate and publicize alternative energy technologies.** Utilizing solar and wind generation for pumping may reduce or stabilize energy costs for irrigators. The NPS program will publicize successful applications of alternative energy systems for irrigated agriculture.

Rangeland

There are three times as many cattle as people in the Big Sky State. Rangeland is the second leading source of NPS pollution. The Montana Watershed Coordinating Council's Prescribed Grazing Standards Work Group developed a set of best management practices that could be employed by both public and private land managers (see Appendix B). Grazing BMPs work better in combination than as single practice. There is rarely a "silver bullet" grazing practice that will treat all water quality problems resulting from livestock management. Ultimately the interest and dedication of the land manager/owner is more important than a particular grazing practice. Every ranch has its own set of resource challenges that are best addressed by someone with years of experience observing the land.

NPS Strategy for Rangeland

1. **Apply BMP audit program to range management on public lands.** Emulate the successful forestry program (see below) and create interdisciplinary teams that will assess the extent and efficacy of BMP application. Each team could include a range management specialist, a hydrologist, a fisheries biologist, a representative of a conservation organization and a rancher or representative of an agriculture organization. As with the forestry program, the audits will track progress over time

and assess how well BMPs are protecting water quality. The audits will identify areas in which more effort is needed; i.e. public education, research, etc. The audit program could also be available, on a voluntary basis, to private range owners.

2. **Include USFS and BLM grazing leases in DEQ environmental assessment reviews.** As resources permit, DEQ will conduct occasional field inspections of grazing allotments to review application and effectiveness of BMPs.

3. **Support BMP implementation.** DEQ will provide technical assistance and grants to private landowners to implement grazing BMPs as part of an approved water quality restoration plan.

4. **Demonstrate and publicize alternative stock watering systems.** Solar and wind powered pumps have the potential to provide livestock water away from fragile riparian areas. The NPS program will work with DEQ's Technical and Financial Assistance Bureau and other agencies and organizations to develop, demonstrate and publicize watering systems that support water quality restoration and protection.

Habitat Modification

Most healthy streams are lined with a verdant border of trees, shrubs, grasses and forbs. This riparian green zone stabilizes the streambank, diffuses flood waters, shades the stream and creates fish and wildlife habitat. Many bird and mammal species depend on the food, water, shelter, and diversity offered by the green zone. In semi-arid prairie lands a riparian area is like an oasis in late summer. Riparian zones mitigate nonpoint pollution by acting as a *biofilter* to trap sediment and other pollutants in run-off water. Riparian vegetation, such as willows and cottonwoods, extract nutrients from the stream and use them to grow. The trees and shrubs shade and insulate the water, preventing over-heating in summer and deep-freezing in winter.

A healthy stream is dynamic, with room to expand and dissipate energy. While some erosion of stream beds and banks is a natural part of the process, there is a rough equilibrium between the volume of water, gradient of the channel and the amount and size of sediment. Riparian benefits are not always recognized and appreciated. Habitat modification is one of the leading causes of impairment on Montana's streams. There is, however, a growing interest in riparian restoration and preservation. Several local watershed groups have used 319 grants to fund restoration and demonstration projects. It is especially heartening that many school groups learn the value of riparian areas by working on restoration projects. Seven state and federal agencies cooperated in the publication of the **Montana Stream Management Guide.** Other BMP guides also stress the importance of maintaining or rehabilitating healthy, dynamic stream systems and riparian areas.

NPS Strategy for Habitat Modification

1. Watershed groups will identify technical, financial and I&E resource needs to implement BMPs for habitat restoration. DEQ will research, discover, demonstrate and disseminate cost-effective techniques for restoring riparian habitats. The NPS program will link local watershed groups with other government agencies and private organizations interested in riparian restoration.

2. DEQ will continue to support and promote volunteer community restoration projects.

Resource Extraction

Working mines are regulated with federal and state permits including point source discharge permits. In order to obtain a permit, mine operators now have to post a bond covering liability for cleanup and restoration. However, abandoned and inactive mines are a significant source of nonpoint source pollution in many Montana watersheds. DEQ's Mine Waste Cleanup Bureau has prioritized 300 sites. The bureau's activities focus on two primary site types: 1) inactive mine sites addressed under the Surface Mining Coal and Reclamation Act (SMCRA 1977); these sites are known as abandoned mine sites: 2) mining related sites addressed under the Federal Comprehensive Environmental Responsibility, Compensation, and Liability Act (CERCLA) or the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA). These sites are known as Superfund sites. Heavy metals and riparian habitat modification are the main adverse water quality impacts from abandoned mines. In developing water quality restoration plans in these watersheds, the water quality planning section will work closely with the Mine Waste Cleanup Bureau. More information about the abandoned mines program can be accessed at http://deq.state.mt.us/rem/mwc/index.htm

Much of eastern Montana lies atop coal beds that are potential sources of methane. The coal bed methane industry estimates that almost 10,000 wells might be drilled in Montana over the next ten years. More than half of these wells will be on federal lands, a fifth will be on state land and the remainder on private lands.

Trapped methane is released from a coal bed by lowering the water level of the aquifer. Wells are drilled into the coal seam. The casing is sealed above the coal and reduced water pressure allows the methane to rise through the well casing. Often most the water is discharged on the surface.

Coal bed methane extraction may have several water quality impacts. Increased flows from surface discharge may damage stream beds and destabilize streambanks. Ephemeral or intermittent waterways are especially vulnerable to gullying. The chemistry of the water is also a concern. The parameters of concern include sodium, iron, manganese, fluoride, chloride, ammonia, silver, aluminum, arsenic, boron, barium, cadmium, copper, mercury, nickel, selenium, lead, strontium, sulfate, zinc, nutrients, Total Dissolved Solids (TDS), the Sodium Adsorption Ratio (SAR), Electrical Conductivity (EC) and Total Suspended Solids (TSS). Salinity is a particular concern. Too much salt in irrigation water can inhibit plant growth and destroy the productivity of the soil. Some ranchers and other landowners are also concerned that coal bed methane wells will lower the water table and reduce supplies available for irrigation, stock watering and rural homes.

Montana has numeric standards for many of the pollutants found in coal bed methane discharge water. The Department of Environmental Quality is working with Wyoming DEQ to set water quality targets for each stream at the Montana-Wyoming border. The quality of the water entering Montana from Wyoming must meet these targets as well as all other narrative water quality standards,. These targets will be used to help establish Total Maximum Daily Load limits for discharges from coal bed methane development or other new point sources and applied to nonpoint sources in the Montana portion of the watershed where water quality indicates the need.. These TMDLs will be

incorporated into water quality plans that are being developed as a cooperative effort of DEQ, local landowners, interested citizens and other government agencies.

NPS Strategy for Resource Extraction

1. The Watershed Management Section will collaborate closely with the Mine Waste Cleanup Bureau in developing TMDLs and water quality restoration plans for impacted watersheds. Much of the assessment work for specific metals and other pollutants is completed.

2. Montana is developing and implementing a coal bed methane policy for protecting surface and ground water that will include TMDLs for parameters of concern. A draft Environmental Impact Statement will be completed fall, 2001.

Silviculture

There are 22.5 million acres of forestlands in Montana, nearly a quarter of the land area. In 1998 the forest products industry contributed $420 million to the state's economy. The forest lands of Montana are also the headwaters for many important rivers and streams. These provide some of the west's best fishing as well as water for agriculture, recreation, drinking water and many other uses.

Montana's water quality protection program for forestry relies on a combination of regulatory and voluntary approaches. In 1987 the first statewide Best Management Practices for forestry were adopted. These practices are described and illustrated in the **Forestry BMPs** handbook, a Section 319 funded publication developed by the Department of Natural Resources and Conservation, Montana State University Cooperative Extension and the Montana Logging Association. BMPs are also promoted at industry meetings, workshops and conferences. In 1989 the Montana legislature required landowners who were planning to harvest a significant amount of timber to notify the state. Under this law best management practice information is sent to the landowner.

Since 1990 biennial audits have tracked the progress of BMP implementation. These audits show considerable progress in BMP application over the past decade (see Table 2-4). The 2000 audit found that forestry best management practices are correctly applied 96 percent

TABLE 2-4: Comparison of Audit Results 1990-2000

	2000	1998	1996	1994	1992	1990
Application of practices that meet or exceed BMP requirements	96%	94%	92%	91%	87%	78%
Application of high risk practices that meet or exceed BMP requirements	92%	84%	81%	79%	72%	53%
Percentage of sites with at least one major departure in BMP application.	9%	17%	27%	37%	43%	61%
Average number of departures in BMP application, per site.	1.4	2	3	3.9	5.6	9
Percentage of practices providing adequate protection.	98%	96%	94%	93%	90%	80%
Percentage of high risk practices providing adequate protection	93%	89%	86%	83%	77%	58%
Percentage of sites having at least major/ temporary or minor/prolonged effectiveness departure.	21%	26%	34%	28%	37%	64%
Average number of effectiveness departures per site.	1	1.5	2.3	3	4.6	8

of the time. Four interdisciplinary teams conducted 42 audits on sites that were harvested within the past two years. Each site was at least five acres and located within 200 feet of a stream. Each team included a fisheries biologist, a forester, a hydrologist, a representative of a conservation group, a road engineer, a soil scientist and a forest landowner or logging professional. The audit teams evaluated up to 46 BMPs at each site. The teams concluded that the practices are 98 percent effective in protecting soil and water resources. Forty-three percent of the audited sites had no recorded impacts and 48 percent had only minor or temporary impacts. There were no sites where major or prolonged impacts were observed. Eight "high risk" BMPs were evaluated separately. These practices are considered crucial for protecting water quality. The audits found 92 percent of these BMPs were correctly applied and providing adequate protection. The most impacts were associated with road maintenance and drainage. Although the audit teams scored each of the four major ownership (state, federal, industrial and nonindustrial private landowner) categories separately, there were only a few percentage points difference in their performances.

The 1991 Streamside Management Zone (SMZ) law regulates forest practices in riparian areas. Since 1994, the BMP audits have also evaluated compliance with SMZ. The 2000 audit found SMZ rules were correctly applied 96% of the time. Of 17 departures from the rules, 14 were considered minor and three major. SMZ effectiveness was rated very high--over 99 percent. Plum Creek Timber, Montana's largest private forest landowner, signed a Habitat Conservation Plan (HCP) agreement with the U.S. Department of Interior in November, 2000. The agreement, which covers 1.5 million acres in western Montana, specifies measures to conserve 17 native fish species, including eight species that are threatened or endangered. The Native Fish HCP adopts a multi-species aquatic ecosystem approach, spanning all watersheds within the project area. All of Plum Creek's land management activities, including timber harvesting, road building, and land sales are governed by the plan. The HCP will help protect and restore water quality in watersheds where Plum Creek Timber is a major landowner.

In the summer of 2000 2,379 fires burned 947,044 acres in Montana. The Forest Service estimates that over 200,000 acres will be salvaged logged over the next three years. Depending on the severity of the burn and the slope, soils and hydrology of the watershed, these salvage operations may pose considerable risk to water quality. Following the 2000 fire season DEQ participated in an inter-agency effort to provide post fire information to private landowners to encourage them to take actions to prevent soil erosion and protect water quality. Revised forestry BMPs have been developed by DNRC and are listed in Appendix C.

NPS Forestry Strategy

1. Update and expand **Forestry BMPs** handbook to emphasize problem areas identified by the forestry BMP audits. Make handbook accessible on the web.

2. Continue to support forestry BMP audit program.

3. Work with resource partners to develop a research project to evaluate the effectiveness of Forestry BMPs in protecting water quality.

4. DEQ will continue to review environmental assessments for timber sales and other significant actions on public lands in Montana. In the coming years, more emphasis will be focused on salvage logging operations.

5. Develop and disseminate best management practices for harvesting and restoring burned forest lands. Reactivate inter-agency fire recovery group as needed.

6. As part of watershed planning process, encourage private forest landowners to develop forestry management plans that include a water quality protection component.

Construction

Construction activities are another source of nonpoint pollution. Erosion of exposed soils increases sediment loads in surface waters. Vehicle traffic may track pollutants (e.g., soil, cement dust, oil and grease, paint, metals) off a construction site onto surface streets where they can be washed into storm drains. Although a temporary impact at a particular site, the cumulative impact in areas of extensive development may be substantial.

Construction activities on projects encompassing more than five acres are covered by a MPDES general discharge permit. Contractors are required to take measures to protect water quality. The impacts of smaller projects are addressed by voluntary BMPs.

NPS Strategy for Construction

1. Watershed planners in areas impacted by extensive development and construction will include projected construction-related loads into TMDLs for sediment and/or other pollutants. Loads from anticipated construction will be incorporated into the "margin of safety" calculations for TMDLs.

2. DEQ will work with local watershed groups and conservation districts to assess the need for construction BMP information and educational media.

3. Local watershed groups will be encouraged to look at county landuse policies to determine if they contain a water quality section that includes potential future impacts .

Urban Runoff/Storm Sewers

Stormwater runoff from urban and industrial areas is a significant source of pollutants such as oil and grease, pesticides and fertilizers, bacteria, and metals (e.g., lead, copper, zinc). The type and concentration of pollutants in stormwater runoff is highly variable. The frequency and intensity of rain affects the amount of pollutants collected in overland flow, the distance pollutants are transported, and the level of sediment deposition and suspension. The volume and intensity of urban runoff increases with the amount of impervious land cover resulting from paving and construction of streets, parking lots, and buildings. With less retention and increased channeling of stormwater flows and streambank instability, severe streambank erosion often results in streams located in urban areas. In the short term, stormwater pollutants may adversely affect aquatic life and restrict recreational use of a waterbody. Over the long term, stormwater pollutants may impair water quality. Montana's stormwater treatment design manual is available from the DEQ Water Quality Discharge Permit Section.

NPS Strategy for Stormwater

Point source stormwater discharges are covered under a general MPDES (Montana Pollutant Discharge Elimination System) permit. Stormwater loads will be included in TMDL development for specific pollutants on a watershed basis. Representatives of

municipalities and other stormwater dischargers will be included in watershed advisory committees.

Land Disposal

Some 300,000 Montanans contribute waste to an estimated 120,000 individual septic systems. A well-maintained septic system in suitable soil does a good job of treating household waste. However, neglected systems or systems in unsuitable soil conditions may be sources of excess nutrients and pathogens. In some areas septic systems are a significant water quality concern. There has been little planning, zoning or infrastructure investment in most of the semi-rural and suburban areas near Montana's major cities and recreation areas such as lakes and ski resorts. Groundwater monitoring in Montana has shown elevated nitrate levels near areas of concentrated septic systems. Nitrate levels above 10mg/L can cause "blue baby syndrome," a condition resulting in decreased blood oxygen in newborn infants.

Several water quality districts and watershed groups are confronting this problem, notably in the Helena Valley, Bitterroot Valley, Flathead Lake and Gallatin Valley-Big Sky areas. **The Montana Lake Book**, a 319-funded publication, addresses the topic, as do two excellent MSU Cooperative Extension Service publications **Septic Tank and Drainfield Operation and Maintenance** and **Septic Tanks: Inspecting and Trouble-Shooting** (both available at http://www.montana.edu/wwwpb/pubs/)

Landfills, particularly unlined facilities, pose a threat to surface and ground water quality. Harmful and toxic substances may leach into the aquifer or surface waters. Twenty-five years ago there were more than 500 landfills and waste dumps in Montana. Most of these have been closed. By 1998 there were 122 licensed solid waste facilities. Thirty-one active and ten inactive waste management facilities are monitored for groundwater quality impacts.

NPS Strategy for Land Disposal

1. Assist local watershed groups in areas where septic systems have been identified as a water quality concern; help these groups develop best management practices for homeowners and small landowners to be incorporated into watershed restoration plans. DEQ will also assist in the development of information and education campaigns.

2. Encourage local watershed groups, water quality districts, conservation districts and county health departments to follow Gallatin and Lewis & Clark County's lead and conduct an inventory of individual septic systems to determine age, condition and potential water quality impact.

3. Include sites of waste management facilities and inactive landfills on TMDL GIS maps and databases to facilitate monitoring and planning in these watersheds.

Flow Modification

Flow regulation and modification affects water temperature, dissolved oxygen, instream flows and streambank stability. Temperature and flows may limit aquatic life and recreational use downstream of the impoundments.

Dam construction submerges river, stream, and riparian habitat and blocks fish migration. Reasonable dam operation is defined by law as a "natural" condition. Dam operators have taken actions to mitigate impacts to downstream fish. The Bureau of

Reclamation modified Hungry Horse Dam to release warmer water during power generation. This has improved fish habitat 47 miles downstream to Flathead Lake. The Army Corps of Engineers has developed a plan for modifying flow below Fork Peck Dam to improve habitat for the pallid sturgeon, an endangered species in the Lower Missouri.

Other sources of flow modification include irrigation weirs, stream impoundments for stock water and reclamation ponds for point source discharges.

NPS Strategy for Flow Modification

1. By state law hydro-electric interests are to be included on local watershed advisory committees (where appropriate). The Unified Federal Policy on Watershed Management includes those agencies which operate dams in Montana, i.e. Army Corps of Engineers and Bureau of Reclamation. DEQ looks forward to working with these agencies, as well as private dam operators, in the development of water quality restoration plans on a watershed basis.

2. Smaller flow impairments will be addressed, as necessary, on a waterbody basis as a component of water quality restoration plans.

Transportation

The state's transportation system contributes to nonpoint source pollution through runoff, atmospheric deposition, flood plain encroachment and construction activities. Chlorides used for melting ice may end up in rivers, lakes and streams. Vehicles release pollutants such as oil and grease, particulate matter and heavy metals (i.e. brake pad asbestos) that are washed into surface waters. Vehicle air pollutants such as nitrous oxides, particulates, lead, and trace levels of other chemical toxins are incorporated into raindrops and deposited into surface waters. Road construction in floodplains and valleys may result in flow constriction at bridges and culverts, soil erosion, and head-cutting thereby increasing a stream's sediment load. Road construction sometimes alters riparian and wetland areas that were protecting water quality. Montana's Department of Transportation works to mitigate wetlands impacts and is using new federal funds to address fish habitat problems.

NPS Strategy for Transportation

1. The Montana Department of Transportation is funding a TMDL planning position to mitigate past transportation projects and avoid future impairments associated with construction and maintenance activities. Where appropriate, transportation impacts will be addressed in water quality restoration plans.

2. Finalize Interagency Agreement on Environmental Review with Montana Department of Transportation

Contaminated Sediments

Metals and long-lived organic toxic pollutants from past mining-related activities, fuel spills, rail yards, wood treatment and other industrial sources often accumulate in streambeds and lake sediments. These pollutants may be directly toxic to aquatic life and humans or they may be concentrated in tissues of fish and higher animals that feed on aquatic life or fish. Through bioaccumulation, these concentrations can reach levels that are harmful to the health of wildlife and humans.

NPS Strategy for Contaminated Sediments

Contaminated sediments will be addressed on a watershed or waterbody basis. Each source of contamination presents its own set of challenges. Removing and disposing of contaminated sediments is often expensive and creates risks and other water quality impacts, such as dispersion downstream. As appropriate, Remediation Division Resources will be utilized to address clean-up.

Natural Sources

Some Montana waters are naturally high in arsenic, nitrate, sediment and sodium. Geothermal sources of arsenic impact the Madison, Yellowstone, and Missouri rivers. Geologic materials in the watershed of the Milk, Powder, and Tongue rivers contribute arsenic to these waterbodies. Nitrate from marine shales in eastern Montana as well as saline seeps in other parts of the state limit the beneficial uses of some surface and ground waters.

Table 2-5: Miles of Stream Impact by Major Sources of Impairment

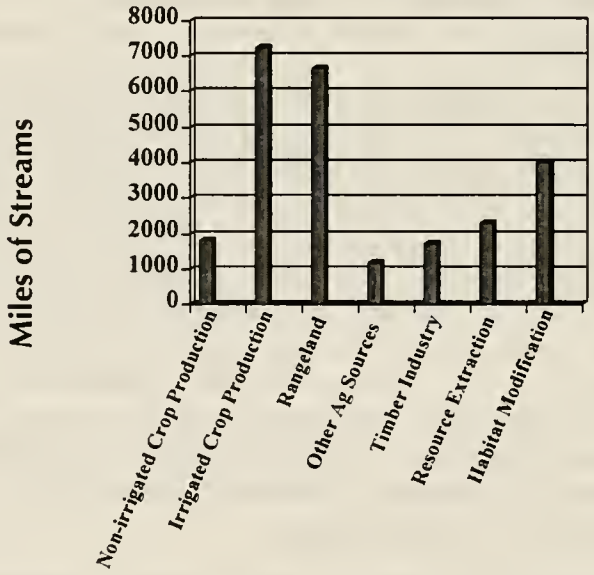


Table 2-6: Lake Impairments

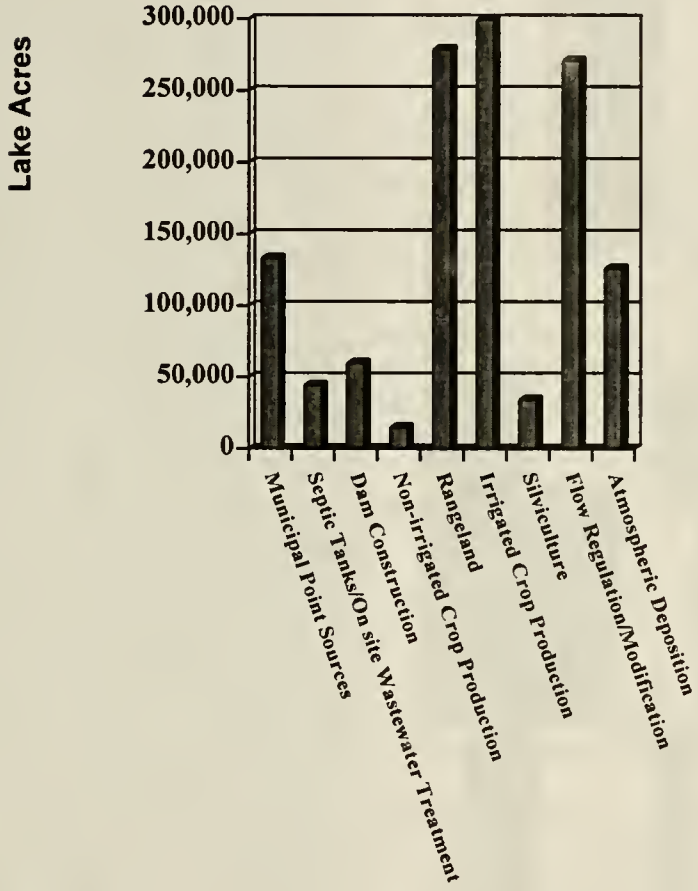


Table 2-7: Pollutants contributed by sources of non-point source pollution in Montana

NonPoint Source	Nutrients	Inorganics	Pathogens/ Coliform	Sediment/ Suspended Solids	Metals	Salinity	Thermal Alteration	Flow Alteration	Habitat Alterations
Agriculture	■		■	■		■	■	■	■
Silviculture	■			■			■	■	■
Construction				■	■		■	■	■
Urban Runoff/ Storm Sewer	■	■	■	■	■	■	■	■	
Resource Extraction	■			■	■	■			
Land Disposal	■	■	■		■				
Flow Modification							■	■	■
Habitat Modification	■			■			■	■	■
Contaminated Sediments		■	■	■	■				
Natural	■	■		■	■	■			

TOTAL MAXIMUM DAILY LOADS

Section 303(d) of the Clean Water Act requires that, for impaired water bodies (those too polluted to maintain their beneficial uses), a Total Maximum Daily Load (TMDL) be established. A TMDL is technically the maximum amount of a pollutant that a lake, river, stream, or estuary can receive without seriously harming its beneficial uses (swimming, drinking, aquatic life, etc.). It is also a quantitative assessment of water quality problems, the sources contributing to the pollution and the amount of reduction in individual pollutants that is required to meet water quality standards. It provides the scientific foundation for a water quality restoration plan to reduce pollutant loads in a certain body of water to meet water quality objectives established in the TMDL. This watershed-wide assessment addresses both point and non-point pollutant sources, such as urban runoff, upstream inputs, air deposition, and sediment, and other pollution sources. TMDL efforts are being integrated into ongoing watershed management initiatives. A major emphasis is being placed on establishing and maintaining landowner, public, and industry involvement.

As part of their TMDL responsibilities, states and authorized tribes are to develop lists of impaired waters [referred to as the Section 303(d) List], set priority rankings for the listed waters, and work with various organizations to establish TMDLs for each listed water.

CHAPTER 3
DESCRIPTION AND IMPLEMENTATION OF THE NPS PROGRAM

State law and a federal judicial order require DEQ to develop water quality restoration plans for every impaired river, lake and stream by May 2007. Montana is second in the nation in the number of pollutant-specific TMDLs it has to do–2350. Four-hundred-seventy-six water bodies were temporarily removed from the 303(d) list for lack of "sufficient and credible data" as defined by the 1997 amendments to the state Water Quality Act. State law requires these waters to be assessed "as soon as possible." Many of these waters will probably return to the impaired water bodies list. Meeting the schedule, complying with the judicial order and retaining state control over the TMDL planning process will require:

- Improved internal coordination and communication between the various DEQ divisions, bureaus and sections.
- Greater cooperation and commitment from all local, state and federal resource agencies.
- Increased state and federal funding for the NPS program, including additional staff for monitoring and assessment, planning and coordination.
- The creation of watershed advisory groups in every watershed planning area. Many existing groups will need additional technical and financial assistance to become effective partners in developing water quality restoration plans.

3.1 WATERSHED PLANNING AREAS

To facilitate the development of TMDLs, the department created 91 "TMDL Planning Areas," generally corresponding to eight and eleven digit U.S. Geological Survey hydrologic unit codes (HUC's). Areas of similar land use and water quality problems were grouped together. In most cases, DEQ chose to use planning areas established by existing watershed groups that have already begun TMDL or watershed plan development.

In October 2000 the department adopted a schedule for completing water quality restoration plans for every watershed planning area. (Table 3-1). Most watershed planning areas contain four to ten impaired waterbodies or stream segments, although some have as few as two and some more than twenty. Altogether, there are over 875 impaired waterbodies (or segments) within these 91 planning areas. The date on the schedule indicates when all plans in the unit will be completed. However, some streams or lakes

Objective (May 2007) Complete restoration plans for every impaired river, lake and stream

within an area may be addressed earlier. In developing the schedule the priority rankings of the 2000 303(d) List were considered. Watersheds containing more high and moderate priority water bodies were generally put earlier in the schedule. However, a few high and moderate priority water bodies were placed late in the schedule due to their expected level of complexity or the need to gather additional information to target restoration activities. Table 3-1 summarizes the number of water quality plans to be completed each year in the four major river basins. Appendix D is the official DEQ schedule for completing water quality restoration plans for each of the 91 planning areas. Flexibility is a component of the schedule. If local interest and/or a process such as the Unified Watershed Assessment calls for it, a watershed planning unit may be advanced in the schedule.

TABLE 3-1 Number of Water Quality Restoration Plans Scheduled by Basin

	2001	2002	2003	2004	2005	2006	2007
Columbia River Watershed							
Watershed Planning Units	1	3	3	2	5	3	8
Waterbody TMDLs	1	25	27	27	78	21	139
Yellowstone Region							
Watershed Planning Units	1	0	1	3	4	5	2
Waterbody TMDLs	6	0	2	15	45	44	39
Upper Missouri							
Watershed Planning Units	0	2	5	3	7	4	9
Waterbody TMDLs	0	8	58	34	58	63	81
Lower Missouri							
Watershed Planning Units	2	3	3	3	3	3	2
Waterbody TMDLs	6	31	29	10	28	19	27
Totals:							
Watershed Planning Units	4	8	12	11	19	15	22
Waterbody TMDLs	17	64	116	86	209	147	286

3.2 Creating Effective Watershed Group Partners

Watershed groups are comprised of citizens who have an interest in the outcome. DEQ is directed, by state law, to consult with watershed groups and conservation districts during all phases of water quality restoration planning. DEQ is directed to request the participation of farmers, ranchers, environmentalists and recreationists, as well as representatives of DNRC, the U.S. Forest Service, Bureau of Land Management, municipalities and the forest, mining and tourism industries. Each watershed group, however, reflects local land and water uses in the community. Conservation districts often take the lead in organizing watershed-based efforts and serve as the fiscal and administrative agent for the group.

The watershed approach is working very well in Montana. Across the state, more than fifty local groups are addressing water quality issues from stream flows to septic tanks.

Several Montana watershed groups have won state and national recognition for their achievements:

- Green Mountain Conservation District helped organize six watershed councils on the lower Clark Fork. One of these, the Elk Creek Watershed Council, has begun to implement a water quality restoration plan that has already shown results in restoring fish populations.
- The Muddy Creek Task Force exceeded the goal of its watershed plan by reducing sedimentation by 75 percent in four years, rather than five. The Task Force has also reduced irrigation return flows and stabilized several thousand feet of streambank.
- The Careless Creek Watershed Project also reduced irrigation return flows and restored 37,000 feet of streambank. The group's efforts have increased wildlife habitat by 19 percent and improved range management on 18,000 acres (so far).

These projects share several common characteristics: they all relied heavily on local support and involvement and all utilized a smorgasbord of funding sources, i.e. 319, EQIP, Fish, Wildlife and Parks' Future Fisheries Program, DNRC's Reclamation Development Grant and other programs.

The Montana experience is that where there are effective watershed action groups there are impressive water quality improvements. Effective groups:

- represent a broad cross section of the community including the water users and land managers who impact water quality as well as the people who value the waterbodies for recreation, water supply or other uses;
- are open to participation, input and ideas;
- facilitate proficient communication (speaking and listening) ;
- are able to identify and address issues;
- utilize appropriate technical expertise;
- develop solutions that a broad swathe of the community will accept;
- achieve buy-in, convince citizens to voluntarily take measures to restore and protect water quality.
- create momentum and continuity; encourage water quality restoration and protection to become a community value.

However, thinking from a hydrological perspective requires an adjustment of geographic perception. Watershed boundaries often bear little or no relationship to political boundaries. People in the upper part of the watershed may not know people farther downstream. They may be in another community, school district and county. While a few watersheds are entirely within a single conservation district, many encompass lands in two or more districts.

Most existing watershed groups came together to address a particular impairment on a specific lake, stream or stream segment. Each group's geographic focus and objectives are largely self-defined. Some watershed groups focus on areas that coincide with the watershed planning units delineated by the TMDL development schedule. Other groups concentrate solely on subwatersheds. A few groups focus on larger areas but confine their attentions to specific problems.

As part of the TMDL planning process, DEQ will identify watershed groups or conservation districts willing to take a leadership role in the development of a water quality restoration plan for each watershed planning area. In areas where no group

assumes a leadership role, DEQ will organize a local advisory committee as defined by state law. These committees will determine their own level of involvement in the process. The committee can serve in an advisory/ technical review capacity or it can take an active role in the planning process participating in all aspects of plan development from assessment through monitoring and implementation.

3.3 Developing Water Quality Restoration Plans

DEQ has prepared an outline to provide direction and consistency in the development of water quality restoration plans. The nine steps identified below are usually addressed in the order presented, although there may be some chronological overlap. Where there are multiple causes of impairment for a given waterbody, the steps can be focused on one particular combination of beneficial use impairments and cause. For example, aquatic life support impairment due to habitat alterations may be treated separately from aquatic life impairment due to elevated metal concentrations. In other situations, all waterbody concerns may be addressed at once. This is the preferred approach since problems and solutions are often related. The following water quality restoration plan steps are still being refined and may be changed somewhat in the future.

1. Initial Assessment (Problem Identification)

a) review waterbody classification and standards
b) inventory and compile existing data and other relevant information
c) perform sufficient credible data review to identify possible impairments
    i) identify probable causes and probable sources for beneficial use impairments
    ii) update list of impaired waters as appropriate
    iii) identify additional reconnaissance level monitoring needs
d) perform reconnaissance level monitoring
e) make additional beneficial use-support determinations
    i) identify probable causes and probable sources as needed
    ii) update list of impaired waters as appropriate

2. Source Characterization (Problem Definition)

a) identify data gaps for characterizing the problem
    i) goal must include identifying actual causes
    ii) another goal must be to identify contributions from all significant sources or source categories
b) identify approaches (monitoring and/or modeling, etc) to fill data gaps
    i) consider all potentially significant source categories, including natural causes
    ii) consider seasonality, year to year variability for modeling or data collection
    iii) address quality control/assurance methods
    iv) develop written monitoring plans as needed
    v) obtain necessary watershed information, such as soil types or land use, for modeling
c) perform monitoring and/or modeling
d) update problem definition using new information to describe cause & effect
    i) describe impairments to beneficial uses
    ii) identify the causes of the impairment (i.e. the pollutants and/or pollution)
    iii) describe amount or percentage of pollutant and/or pollution contributions from each significant source category

iv) update listing of impaired waterbodies and associated causes and sources

3. Identify Targets (Goal Setting)

a) define desirable conditions relative to water quality standards and available information from Steps 1 and 2.

b) set one or more targets using appropriate expressions aimed at meeting water quality standards and other related watershed goals

i) incorporate a factor of safety, seasonality, and other appropriate variables

ii) utilize concentrations associated with numeric standards when available

iii) focus on measures pertaining to the impaired beneficial use when possible

iii) allow for future growth/future sources as appropriate

c) identify necessary reduction(s) or modification(s) needed to meet the target

i) identify the desired load reduction where a load calculation is possible,

ii) ensure that any identified reductions are measurable

iii) ensure that current conditions minus reduction will result in meeting target

d) review information from Steps 3a through 3c and determine an appropriate expression for the TMDL or TMDL surrogate

4. Develop Source Allocations (Apportioning Responsibilities)

a) identify potential management practices that could help reduce loading or levels of pollution for each significant source category

b) develop approach for achieving source reductions based on equitability, feasibility, confidence in available science, funding opportunities, and willingness to implement management practices

c) allocate management practices and associated load reductions/restoration responsibilities for each significant source category

i) ensure that selected management practices, once applied, will achieve desired target(s)

d) develop an estimated timeline for achieving target(s)

i) consider technical, financial, and cultural aspects of implementation

ii) consider response times between implementing management options and obtaining water quality improvements

5. Develop a Long Term Monitoring Plan to Measure Overall Success

a) identify parameters to be monitored to verify target(s) or trend(s)

b) identify when and where monitoring is needed (must be at least within 5 years)

c) identify any additional baseline monitoring needs (such as photo points, etc)

d) identify funding and responsibilities for monitoring

6. Write a Water Quality Restoration Plan

a) Capture information from Steps 1 through 5, in draft document plan,

i) include a summary of water quality restoration efforts to date

ii) include information on how the public was involved

b) Provide opportunity for watershed group, agency, landowner, and general public review and input on the draft document

c) Submit final plan to EPA for approval

d) Update list of impaired waters requiring restoration plan development

7.Identify Specific Implementation Details

(1) Step 7 includes important planning information to help achieve water quality restoration, although the information is not currently required within the written plan submitted to EPA for approval.

(2) Steps 7 and 8 are based on a program of voluntary implementation for nonpoint source activities occurring on private property

a) prioritize management practices

b) identify technical assistance needs

c) identify potential projects

i) develop detailed schedule and other implementation specifics

ii) develop cost estimates and identify funding sources

d) identify methods to monitor success of specific management practices

8. Implement Management Practices

a) track progress and monitor implementation of management practices

b) use information gained to help design and develop future projects

9. Perform Long Term (or Trend) Monitoring Identified Under Step 5

NOTE: This is a required step and must be performed at least within five years of completing the water quality restoration plan (Step 6)

a) evaluate progress toward meeting target(s)

b) update the water quality restoration plan and related components as needed

c) update the list of impaired waterbodies as needed

TABLE 3-2 Examples Of Delegated Watershed Planning Responsibilities

	Watershed Group	Conservation District	DEQ	Other Agencies	Consultants
1.Initial Assessment	2	2	1	2	3
2.Source Characterization	1A	1A	1A	1A	3
3. Identify Targets	1A	1A	1A	1A	3
4. Develop Source Allocation	1A	1A	1A	1A	3
5. Develop Long Term Monitoring Plan	1A	1A	1A	1A	3
6. Write WQ Restoration Plan	1A	1A	1A	1A	2
7. Identify Implementation Details	1	1	2	2	2
8. Implement Management Practices	1A	1A	1A	1A	3
9. Perform Longterm Monitoring	2	2	1A	1A	2

1—Lead

1A-Colead opportunity

2—Possible major Contributor of input, data provider, or other forms of assistance

3— Opportunity to become involved in process

3.4 IMPLEMENTATION

The goal of the NPS Program is to restore and protect water quality through the implementation of voluntary best management practices identified in approved water quality restoration plans.

An implementation strategy is an integral part of the water quality restoration plan. The strategy should explain *who* is going to do *what*, and *where* and *when;* and *how* they are going to do it. The plan doesn't need to name specific landowners in setting BMP targets, but it should indicate how reductions will be achieved based on the causes and sources of impairment. For example, if a cause of impairment is streambank erosion, then the plan will set targets for restoration, e.g. 3500 feet of bioengineering stabilization and reduction of peak flows by improved land management on 15,000 acres of rangeland. If the source of sediment is cropland erosion then the plan will specify 1) BMPs for reducing erosion and/or preventing sediment from reaching the streams and 2) the total area where BMPs will be applied. In a perfect world the amount of reduction would be proportionate to contributions. However, this is not always economically feasible. The relative cost of achieving reduction targets may be greater for some contributors than others. State law directs DEQ to consider the "environmental, social and economic costs and benefits" of implementing a TMDL.

The Montana Water Quality Act instructs DEQ to "inform and assist" landowners in the application of sound soil, land and water conservation practices. While the department lacks the resources to provide much direct one-on-one assistance to landowners, DEQ can link watershed groups and conservation districts to appropriate sources of technical and financial assistance. The NPS program has produced and/or helped to fund several BMP publications. It is anticipated that the watershed planning process will identify additional information and education media needs.

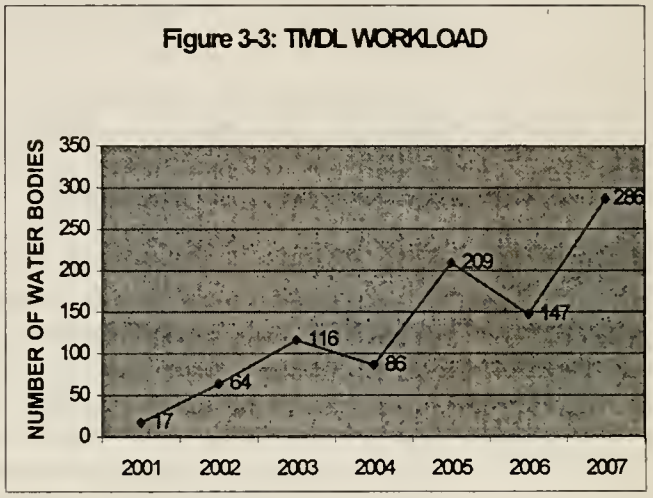
Despite the exigency of the TMDL planning process, DEQ will continue to devote resources to BMP implementation. It will be important to evaluate the effectiveness of BMPs in meeting water quality targets early in the watershed planning process. DEQ will focus 319 funds and other resources on implementation of BMPs in approved water quality restoration plans.

An objective of the NPS program is to implement water quality restoration plans within five years of EPA and DEQ approval. Thus far, all approved nonpoint source TMDL plans have been closely tied to implementation. Indeed, water quality has been improved in several of the project areas: Deep Creek, Muddy Creek, Elk Creek, Big Creek (Park County) and Careless Creek. Provided adequate resources are available, the implementation schedule will follow the planning schedule, with most the plans approved in 2001 being implemented by 2006 and the 2007 plans achieving implementation by May 2012. DEQ recognizes that some water quality problems will not be resolved quickly and inexpensively. The mandated five-year evaluation of water quality restoration plans will identify areas that require additional resources and greater efforts to restore beneficial uses.

Objective (May 2012) All water quality restoration plans implemented and most beneficial uses restored to rivers, lakes and streams.

3.5 FUNDING CLEAN WATER

Figure 3-3 illustrates how DEQ's workload will increase ten fold from 2001 to 2003. Yet the big crunch is going to come after 2003. Two-thirds of the watershed planning units and 75 percent of the impaired waterbodies will be addressed from 2004 to 2007. Using EPA GAP analysis, the monitoring section estimates it will require three times their present resources to complete the assessment requirements of the schedule.



Most of Montana's NPS program budget comes from the federal government. Section 319 funds pay 100 percent of the grant program and 60 percent of DEQ's program cost. In 2001 DEQ had $1,900,000 available for section 319 projects while grant requests exceeded $3 million dollars. DEQ could easily expend all 319 monies on developing TMDLs. However, such an approach would effectively sever the link between plan development and implementation. It would also reduce citizen enthusiasm for serving on watershed advisory committees. Why develop a plan that has little or no chance of implementation? An effective watershed group creates momentum that extends from planning into implementation. One of the tasks of a watershed group is to identify resources for implementation activities. Most will find there aren't enough funds for the work that needs to be done. Without adequate implementation funds, the required seven year planning effort could turn into an exercise in futility.

In order to meet the goals of the 1997 amendments to the Water Quality Act, comply with the federal judicial order and continue state management of the nonpoint source program, the state will have to make a more substantial commitment to water quality.

Some states, such as Washington, California and North Carolina have created dedicated funds to support clean water actions. There are many indications that Montana citizens favor increased restoration activity and spending on environmental protection.

DEQ will work with conservation districts, watershed groups and other state resource agencies to develop a proposal to create a "Montana Clean Water Fund." The proposal will identify the level of funding required to complete the planning process by 2007 and achieve substantial water quality restoration by 2012.

The priorities for the Montana Clean Water Fund would include:

1) Completing water quality restoration plans on schedule by
   a) Providing increased financial support to conservation districts and local watershed groups.
   b) Increasing DEQ water quality program staff;
2) Implementing restoration activities and best management practices identified in approved plans. Examples of priority implementation activities would include investment

in irrigation infrastructure, riparian habitat restoration and cost share for BMP implementation.

In ten years, Montana could make considerable progress in restoring beneficial uses to nearly every river, lake and stream.

Objective (December 2002) Present Montana Clean Water Fund Proposal to 2003 legislature.

3.6 Improving Internal DEQ Coordination

Several different bureaus and sections deal with water quality issues within the Department of Environmental Quality. Much of the time these different groups work independent of, and perhaps unaware, of the work going on in other sections and bureaus.

However, the watershed planning process requires the collaboration of many different DEQ programs. A water quality restoration plan addresses all major point and nonpoint sources of impairment. Collating the appropriate information involves the Permitting and Compliance Division, the Water Quality Standards Section and the Water Quality Monitoring Section as well as the Watershed Management Section. Watersheds that provide drinking water to a community would involve the Source Water Protection Program. Some watershed plans will need the involvement of the Mine Waste Cleanup Bureau. Where atmospheric deposition has been identified as a source, the Air Quality Planning and Standards and Air Quality Monitoring sections may be brought in. Some watershed groups will utilize the State Revolving Fund (a complete description of DEQ programs that interface with the NPS program is contained in chapter 5).

The two sections that coordinate most closely on watershed plan development are Watershed Management Section and Water Quality Monitoring Section. Each section has a water quality specialist assigned to each of the four major river basins. The water quality planner and monitoring specialist form an effective working team to help local watershed groups develop water quality restoration plans. The two sections are presently assigned to different bureaus and are located in separate buildings which makes coordination and communication difficult. A long-term goal of the department is to restructure and co-locate the two sections.

The department created a Watershed Management Team (WMT) to review program commitments and emerging policy issues within watersheds. The WMT reviews and evaluates DEQ activities within the sixteen sub-basins (see map on page 2-3). The WMT will also be an effective forum to identify emerging issues where a watershed approach is needed to resolve water quality problems. Additionally, the WMT identifies opportunities to coordinate, to leverage the use of department resources, to eliminate redundancies, to improve consistency in DEQ water quality strategies, and to more effectively identify local needs.

Objective (March 2001) DEQ management will designate TMDL development as one of the department's highest priorities. Department management will direct all divisions, bureaus and sections to support and collaborate with nonpoint program in developing water quality restoration plans and meeting the court-ordered schedule.

Objectives (June 2001)

1. Improve coordination between monitoring and planning sections by: a) changing dual management structure; b) improving management under existing structure; and/or c) finding suitable office space to bring together staff in the same building.

2. The Resource Protection Planning and Monitoring and Data Management bureaus will organize work teams for each of the sixteen sub-basins. Each team will include DEQ staff from the: Enforcement, MPDES (permitting), Source Water, Wetlands, Water Quality Standards, State Revolving Fund, Hazardous Waste Cleanup, Mine Waste Clean-up and state Superfund programs. The teams will work together to achieve and protect water quality standards and restore beneficial uses, and whenever possible, develop TMDLS.

3. In most cases, watershed or monitoring section staff will serve as team leaders. However, other programs may be assigned the leadership role when they are responsible for the bulk of water quality activity in the basin. Team leaders will promote cooperation, coordinate the development of team goals and objectives, set work priorities, distribute workloads, determine standards of performance, set schedules and deadlines, evaluate progress and recommend corrective measures.

4. Watershed Management and Monitoring sections will utilize DEQ Intranet site to update the rest of department on watershed planning activities.

3.7 Improving Interagency Coordination, Cooperation and Communication

Even though the legislature gave DEQ the primary responsibility for implementing the Water Quality Act, protecting and restoring water quality is every state agency's (and citizen's) duty. The legislature recognized the role of other agencies in the TMDL process by specifically including them on state and local advisory committees.

Federal agencies are also compelled to comply with the Clean Water Act and state water quality standards. The new **Unified Federal Policy on Watershed Management,** promulgated in October 2000, pledges improved cooperation between federal agencies and state and local governments. The policy endorses a watershed approach to address water pollution from federal land and resource management activities. Federal agencies in five federal departments will identify and incorporate watershed management goals in their planning, programs and actions. Federal agencies will collaborate with state, local and tribal governments in prioritizing watershed restoration work and in identifying and implementing best management practices on federal lands. Federal agencies will also coordinate water quality monitoring and assessment activities with other resource management entities. They will share training, information and technical expertise and promote collaboration and consistency in watershed management projects. Since about a quarter of Montana is managed by the federal government the cooperation and support of these agencies on water quality issues is a critical element in restoring and protecting Montana's water resources.

The NPS program has good working relationships with state and federal resource agencies. The Natural Resources Conservation Service provides valuable technical

Objective (July 2001) - Revise Memorandums of Understanding with federal resource agencies to include the goals and objectives of the **Unified Federal Policy on Watershed Management** as well as the schedule for completing water quality restoration plans.

Objectives (July 2001) Work with the Governor and her Cabinet to designate water quality restoration as a high state priority; and to facilitate cooperation in plan development and implementation by other state agencies. Develop Memorandums of Understanding with other state agencies delineating their roles in the TMDL process.

assistance to landowners, conservation districts, watershed groups and local governments in developing and implementing BMPs, TMDLs and watershed management plans. NRCS has assigned a water quality specialist to work directly with the Watershed Management Section. Even prior to the new policy the Forest Service and Bureau of Land Management cooperated in watershed monitoring and management activities. In several watershed projects, the Bureau of Reclamation contributed valuable technical assistance. The NPS program relies on data produced by many federal agencies including USGS and EPA.

On the state level, the Department of Natural Resources and Conservation is delegated many watershed and water quality responsibilities. DNRC administers the Streamside Management Zone law and the Floodplain Management Act as well as water rights and projects that impact navigable waters below the low water mark. DNRC's Trust Land Management Division manages more than five million acres of state-owned land. The division's participation and cooperation will be crucial in watersheds where the state is a major landowner. DNRC also provides assistance to conservation districts and watershed groups as well as administering the Renewable Resource Grant and Loan Program (see chapter 4).

The Department of Fish, Wildlife and Parks is also very concerned about water quality issues. Several Montana fish and wildlife species are listed as endangered, threatened or sensitive. To survive and thrive, trout need water that is "clean, cold and connected" (connected means that fish are able to move up and down stream to spawn and find food). This is a fisheries equivalent of "meeting water quality standards and restoring beneficial uses." FWP has rated 934 fish resources as "outstanding," 411 are rated as "high," 503 as "substantial," 1,214 as "moderate," and 2,010 as "limited." FWP's Future Fisheries Program funds are used to restore habitat and improve stream flows. DEQ coordinates with FWP by serving on the Bull Trout Restoration; Yellowstone Cutthroat Trout Restoration; and Westslope Cutthroat Trout Restoration committees.

The NPS program works closely with the Montana University System Water Center. The center supports water research; provides training and education for water professionals; promotes problem-solving partnerships among higher education, government, and the private sector to respond to water-related challenges and training needs; and serves as a clearinghouse for Montana water information.

All the above agencies and several more are active in the Montana Watershed Coordination Council. The council serves as a statewide coordination network for Montana's state, local and federal natural resource agencies as well as some interested private organizations. The council was created to share resources, identify and capitalize on opportunities for collaboration, and avoid duplication of efforts. The main purpose of the council is to assist local watershed groups. The council's agenda and work plans are driven by the self-identified needs of watershed groups. The council has created seven work groups to enhance collaboration among agencies and provide specific services to watershed groups. For example, the Grazing Practices Working Group developed **Best Management Practices for Grazing.** There are also working groups addressing groundwater, wetlands, water activities, water quality monitoring and information and education. For more information about the watershed council see http://water.montana.edu/default.htm

Objective (May 2001) Develop scoring criteria for use by the Watershed Coordination Council that gives TMDL plan development and implementation highest priority for 319 grants. Work with the council to give priority to projects based on the court-ordered schedule.

One of the most substantive tasks of the council is to review Section 319 grant requests and make recommendations to the Department of Environmental Quality. More than two dozen people from various agencies and organizations are involved in the review process. This approach gives DEQ a wide range of technical expertise, project management experience and scientific knowledge in the selection of 319 projects. However, DEQ must target a larger share of 319 funds to water quality restoration planning that results in TMDL development and implementation.

Another major source of funds for water quality projects is the Environmental Quality Incentives Program (EQIP) administered by the USDA Natural Resources Conservation Service (NRCS). EQIP assistance has been crucial to implementing projects across the state including the Sun River, Careless Creek, Sage Creek, Ruby River, and Musselshell River. Some watershed groups have combined EQIP and 319 to fund projects. EQIP funds are allocated based on the recommendations of a state technical committee that includes representatives from farm and conservation organizations, Indian Tribes, conservation districts and state agencies including DEQ. The Montana priorities for EQIP funds are water quality, water quantity and grazing land health. In 2000, there were 379 applications totaling $9.7 million. Only 244 projects for a total of $4.63 million could be funded.

Objective (June 2001) Request that NRCS State Technical Committee give priority to watersheds that have developed water quality restoration plans that show a direct relationship between best management practice application and quantifiable water quality improvement.

DEQ participates in other statewide forums that will continue to be a source of direction and coordination for DEQ watershed activities. These advisory councils and forums include:

- Source Water Assessment Program Advisory Council
- Statewide TMDL Advisory Group
- Montana Association of Counties
- Montana League of Cities and Towns
- Wetlands Advisory Council
- Water Pollution Control Advisory Council
- Board of Environmental Review

Coordinating with Tribes

There are seven sovereign Indian reservations within Montana. The tribes have the authority to establish water quality standards and develop water quality restoration plans for water bodies within their jurisdictions. The state does not include waters within reservation boundaries on its 303(d) list, nor did DEQ include tribal waters in the schedule for developing water quality restoration plans. However, many watersheds include lands under both tribal and state jurisdiction. In some cases the tribal boundaries follow the middle of major streams and rivers. Addressing water quality issues in these watersheds

Objective (December 2001) - Develop Memorandums of Understanding with tribal governments defining roles and responsibilities for developing water quality restoration plans for watersheds with shared jurisdiction.

will require a coordinated monitoring, planning and implementation process. Each of DEQ's four basin coordinators will be the contact person for coordination with the tribes in their areas.

3.8 Watershed Approach Inventory, Monitoring, Characterization, and Assessment

3.8.1 Montana Statewide Monitoring Plan

Montana DEQ currently is coordinating with the US Geological Survey (USGS) to develop a new water quality monitoring plan for Montana. The plan will include the monitoring of fixed stations and reference sites, and stream assessments.

Fixed Stations

The major goal of the fixed station monitoring is to determine statewide water quality status and trends. Thirty-seven fixed station sites are currently being monitored. The fixed station sites are located at active USGS flow gauging stations and include the mainstem of Montana rivers and their major tributaries. At this time, fixed station monitoring includes four water column samplings per year. Water column samples are collected in the spring during the rising, peak and falling limbs of the runoff portion of the annual hydrograph, plus during the late summer to characterize base flow. The water column is analyzed for total suspended sediment, nutrients, metals, common ions, pH, temperature, and conductivity. In the future DEQ intends to sample for sediment (streambed) trace metals, benthic chlorophyll, and macroinvertebrate and algae communities at the fixed station sites once per year (late summer). DEQ also anticipates assessing the fish communities every five years (8 sites/year), and conducting an air photo survey of each river segment or major tributary every ten years (4 sites/year). These evaluations will characterize the streams' geomorphology and riparian habitats.

Reference Sites

One objective of monitoring the reference sites will be to improve the beneficial use support decision criteria that DEQ uses to determine if a stream segment is water-quality limited. Once adequate funding is identified, DEQ hopes to sample approximately 12-16 reference sites per year. These reference sites will be evenly distributed between four regions: Upper Missouri, Lower Missouri, Yellowstone and Columbia; new reference sites will be selected every three years. DEQ anticipates working with local groups and agencies to establish the location of the reference sites that are representative of the major stream types found in Montana. Reference site monitoring will probably include the sampling and analyses of the water column and sediment (streambed) chemistry, periphyton chlorophyll, community structure, and macroinvertebrates.

Stream Reach Assessments

The objective of the targeted stream reach assessment is to identify stream segments that are not currently on the 303(d) list, which are water quality limited and require restoration plans. DEQ anticipates collecting a combination of chemical and biological data when conducting stream reach assessments. DEQ also intends to conduct stream reach habitat assessments that would include a combination of qualitative evaluations with photo points, and quantitative measurements of the stream geomorphology and riparian vegetation. These assessments will likely target stream reaches that are perceived by the public to be water quality limited. The Water Quality Monitoring Work Group (WQMWG) of the Montana Watershed Coordination Council (MWCC) will serve as a

Objective (May 2005) Complete assessments for all TMDL Watershed Planning Areas.

forum for discussing and setting monitoring priorities. The number of stream reach assessments that will be conducted each year will be dependent on available funding.

4.1.1 Assessment

The Non-Point Source (NPS) Program participates in and uses a wide range of assessments at all levels in the watershed framework. Assessments are completed to fulfill CWA requirements, determine status of the resource, identify remediation needs, and set program priorities. Each assessment task has its own set of assessment endpoints and guidelines. A list of the assessments that involve the NPS Program will be briefly discussed.

Assessments Completed Primarily in a Statewide Forum: DEQ is involved with several assessments through the Montana Watershed Coordination Council (MWCC). The EQIP project prioritization is an example of a collaborative assessment activity. In addition, the MWCC discusses activities in a different major river basin each calendar quarter (e.g., Lower Missouri). A subcommittee of the MWCC also coordinates the Unified Watershed Assessment, which the NPS program publishes.

Assessments Completed Primarily to Support DEQ Programs: DEQ organizes an assessment process to develop and identify impaired waterbodies that are included on the 303(d) list.; this list is updated every two years. DEQ has guidance for determining if data are sufficient and credible for making listing decisions and beneficial use support determinations. This TMDL program also has a list of 13 different parameters to guide TMDL prioritization.

DEQ produces the 305(b) Assessment document that is reported to Congress on the status of the state's waterbodies every two years. The format is under consideration to determine how it can be designed to better support DEQ and the needs of local group waterbody assessments.

DEQ has produced the State Source Water Assessments Plan, which describes the statewide strategy for implementing the drinking water supply assessment and protection program.

The State Revolving Fund conducts a NPS and point source needs assessment to identify potential loan needs that the program can support.

The Wetlands Program supports an ongoing wetlands identification program that provides information to the National Wetlands Inventory. This program also supports the assessment of Unique Wetland Habitats for the Heritage Program.

The Remediation Division's Abandoned Mine Cleanup Program has completed an assessment to identify and assign priorities to abandoned mines for a statewide schedule of cleanups.

The Wetlands program supports an ongoing wetlands identification program that provides information to the National Wetlands Inventory. This program also supports the assessment of Unique Wetland Habitats for the Heritage Program.

Assessments developed by local watershed groups and local governments:

Local watershed groups undertake watershed projects to address a wide range of objectives. Water quality represents only one of the many possible objectives that drive local watershed planning efforts including:

- Community Planning for growth and development;
- Source Water Assessment to protect drinking water supplies;
- Planning to evaluate water quantity management needs;

- Riparian assessments to support fishery habitat needs;
- Grazing management evaluations;
- Assess the impact of weeds on range conditions and as agricultural pests;
- Forest fire susceptibility to support prevention and response alternatives;
- Others

Know Your Watershed (KYW) is a national coalition of local watershed groups and agencies whose mission is to support the development of local watershed partnerships. The KYW has assisted hundreds of local watershed groups become established and to develop and implement watershed plans. KYW believes that a critical first step in the watershed process is inviting all interested stakeholders to participate. The next critical element is the acquisition of information that will be essential to watershed assessment and lanning. The following list of maps and information that provide critical baseline information about the watershed is based on recommendations provided by KYW (http://www.ctic.purdue.edu/KYW/brochures/ Puttogether.html) including:

- watershed boundaries;
- terrain (slopes, aspects);
- water bodies (flows, volumes);
- soil types;
- geology;
- roads;
- land uses;
- vegetation;
- recreational uses;
- fish and game surveys;
- water quality surveys;
- development and employment trends; and
- historical uses.

3.8.3 Information Management Systems

The internet has been a boon to resource managers in Montana. Today anyone with access to the worldwide web can obtain a lot of information about our watersheds. The Natural Resources Information System (NRIS) of the Montana State Library developed EnviroNet, a web-based application providing watershed information from DEQ's waterbody assessment data base. EnviroNet is an extension of current web services provided by NRIS and includes the following functions:

- Searching for and downloading many GIS coverages in data clearinghouses.
- Providing links to other data providers and other data systems.

As NRIS and partner agencies move forward with EnviroNet, its current limitations will be addressed, including:

- There is no easy way to query and integrate data from on-site NRIS files and other data providers

- Entire GIS coverages must be downloaded. No function allows the user to select a particular geographic extent and download only that portion.
- Data from multiple sites frequently requires significant reformatting.
- Data is stored is a wide variety of formats and is not necessarily compatible.
- Data is geo referenced in a wide variety of formats.
- Meta data and data citations are highly variable - from good to not available.

NRIS has proposed the following strategy to improve EnviroNet's capabilities:

- Centralized Data Strategy - Combine tabular data from within NRIS and from other agencies (via data exchange formats) into a single source, centralized database at NRIS that is capable of storing tabular and spatial data.
- Include standardized stream and water information data and data obtained through exchange formats.
- Include NRIS GIS data, using latest technology from Earth Science Research Institute (ESRI).
- Include Natural Heritage Data.

EnviroNet will be equally accessible to local watershed groups, and state and federal agencies. As indicated by the proposed strategy several agencies and organizations will be providing EnviroNet with the information necessary to support watershed planning and management. EnviroNet benefits its users in many ways including the following:

- Providing a single, independent, platform for application interface to all of NRIS data, as well as data incorporated from other data providers through exchange formats over the internet.
- Faster, more powerful, and more efficient search and download capabilities - users could specify their area of interest, choose the themes or data layers they want, and view a map or report online, or download data to their local machines.
- Data is stored in a single database, formats are standardized, and all data is compatible and geo-referenced in a single system.
- Datasets could be quickly updated as needed.
- Tabular, graphic, and geographic input and output options. Such a system would provide great flexibility to agencies in input and output formats. Query interfaces could be geographic (map) or tabular in nature. Custom reports, summaries, graphics, and maps could be generated on-line. Tabular and spatial data could be downloaded. For sensitive data, security could be built in, to allow access to authorized users only.

DEQ has contracted with NRIS to develop a web-based GIS application specifically for watershed planning and TMDL development. Conservation districts, watershed groups, DEQ and other resource agencies are the primary audience for the program. Software development has been completed and the interactive mapping function is up and running at http://nris.state.mt.us/mapper/tmdloutreach. A related web page will include access to interactive mapping applications, updates, a calendar of events (workshops and meetings), training materials, and a request for feedback. As part of the contract, NRIS is providing training on TMDL applications for users. This includes on-line tutorials and help screens as well as workshops and informational seminars.

Over the long-term DEQ's web based information system for watershed planning will continue to evolve. The department will shift to an Enterprise-GIS system that will increase our capacity to collect, store and share data.

3.9 NPS Protection Strategy

Montana has many rivers, streams and lakes which are *not* impaired. These high quality water resources are very important to Montana residents and visitors. Tourism is one of Montana's leading industries. Visitors from throughout the country and world come to Montana to fish, swim, canoe, river-raft and admire the state's scenic beauty. State law requires DEQ to prevent the degradation of these high quality waters.

There are many waterbodies that are partially impaired by one cause but which fully support most beneficial uses. These waters are also in need of a protection strategy to prevent further degradation.

The watershed approach facilitates water quality protection. The assessment process will identify high quality waters which are not impaired. The watershed plan will delineate potential threats to water quality; for example increased rural population or new mining activities. A prevention strategy ought to be a component of a water quality restoration plan. Once a restoration plan is implemented it should be revised by the local watershed group to become a water quality *protection* plan. The plan would include a schedule for regular water quality monitoring (which could be tied to DEQ's rotating basin schedule to prevent duplication and efficiently utilize resources) as well as a mechanism for recognizing and responding to potential threats or new sources of impairment.

Many of the NPS strategies described in Chapter 2 serve as both restoration and protection activities. For example, the forestry BMP audit program prevents water quality degradation by reducing impacts from harvesting and other silvicultural activities (see page 2-12). DEQ also prevents degradation by reviewing environmental assessments produced by federal and state resource agencies.

The intra-agency and interagency collaborations described in the next chapter will also prevent water quality degradation.

Objective (ongoing) Promote water quality protection through newsletter and newspaper articles, brochures, websites, field tours, public presentations and other appropriate means.

CHAPTER 4
PROGRAMS AND AGENCIES WITH WATERSHED MANAGEMENT RELATED PROJECTS: OPPORTUNITIES FOR COORDINATION AND COLLABORATION

The NPS program must collaborate closely with all agencies and organizations involved in the protection and restoration of watershed health and water quality in Montana. This chapter briefly describes the activities of state and federal agencies which contribute to the stewardship of watershed health and water quality in Montana and lend themselves to a watershed approach. One of the EPA requirements of the NPS Management Plan is to describe how the program will work with other agencies and programs to achieve water quality objectives. To address this requirement each brief overview of agency and program activities is followed by a list of coordination and collaboration opportunities that the NPS program will pursue within the watershed framework. These are both long and short tem goals of the NPS program. The listing of an opportunity does not imply a commitment or requirement on the part of the associated agency or program. The purpose of the list is to develop a dialog and awareness of the opportunities that could lead to voluntary coordination or collaboration between the NPS program and those that are listed in this section. The agency and program coordination and collaboration opportunities also apply to local groups managing resources and water quality on a watershed basis. Collaboration opportunities include unique information the program can contribute to watershed assessments, funding sources, technical assistance, and any other contribution that can be incorporated into the watershed framework. Table 4-1 at the end of the chapter summarizes agency programs as they relate to sources of nonpoint pollution.

DEQ creates working partnerships with local agencies and organizations. Conservation districts, water quality districts, land trusts and environmental and conservation groups are aware of regional problems and are often in the best position to educate citizens and implement water quality protection and restoration projects.

This chapter provides comprehensive information about the data, expertise, and funding available to aid local agencies and groups with their planning and implementation of projects. Additionally, DEQ hopes this chapter will guide its efforts to coordinate and collaborate with other state and federal agencies whenever and wherever feasible in order to leverage resources and minimize duplication of effort. It is anticipated that the Montana Watershed Coordination Council be the vehicle for exploring and implementing these opportunities.

The Montana Watershed Coordination Council provides a forum for local, state and federal agencies to coordinate their efforts. In addition, the MWCC gives local watershed groups the opportunity to more effectively communicate their needs with agencies whose mission are to enhance, conserve, and protect natural resources and sustain the high

quality of life in Montana for present and future generations. The MWCC already serves as a statewide coordination network for Montana's natural resource agencies and private organizations to share resources, identify and capitalize on opportunities for collaboration, and to help avoid duplication of effort. The Council fosters coordination, communication, and cooperation. The council does not set policy or attempt to usurp any organization's authority or responsibility. The MWCC encourages local people to take a proactive, collaborative approach (e.g., Coordinated Resource Management Planning) that will address natural resource issues and concerns.

There are several organizations not addressed in this section that provide valuable assistance to watershed planning and management in Montana. A few of these organizations include Montana's Wetlands Council, Montana Riparian and Wetlands Association and Montana Watercourse. These organizations are also key sources of information and avenues for collaboration among agencies and groups and provide training for skills necessary to watershed management (e.g., monitoring). Since this document is not all-inclusive, DEQ welcomes any information on other organizations that have similar missions and that promote coordination. The information will be used immediately and incorporated into this plan in future revisions.

4.1 STATE AGENCIES

4.1.1 Department of Environmental Quality

The Department of Environmental Quality's (DEQ's) mission is to protect, sustain, and improve a clean and healthful environment to benefit present and future generations. DEQ is organized into five divisions: Centralized Services; Planning, Prevention & Assistance; Enforcement; Remediation; and Permitting & Compliance. Many activities and programs within these divisions contribute either directly or indirectly to the management of nonpoint source impacts on water quality. Identifying those activities and programs by watershed areas would enable the divisions to coordinate and collaborate to make more effective improvements in water quality and to make more efficient use of limited funding and staff availability. Some of these programs and activities include:

Permitting and Compliance Division

The Permitting and Compliance Division reviews and assesses nearly all environmental permit and license applications. The division prepares environmental review documents to comply with the Montana Environmental Policy Act (MEPA). The division also conducts facility inspections and reviews reports to determine compliance with permit conditions, laws and regulations. Activities within the division which affect nonpoint sources and water quality include the following:

Air and Waste Management Bureau: The Air and Waste Management Bureau addresses the deposition of air pollutants onto water bodies through its permitting and inspection activities. Opportunities to provide short-term collaboration and coordination with the NPS program include the following:

- Participation in Watershed Management Team meetings on as-needed basis.
- Participation on DEQ TMDL work teams where bureau activities are related to water quality restoration and protection.

- Identify potential contaminant sources within watersheds to incorporate into water quality restoration plans and source water assessments. This information includes the identification of ground and surface waters impacted by section-regulated facilities such as permits for hazardous waste sources and facilities where atmospheric deposition may be contributing to water quality degradation.
- For TMDL development: provide monitoring data from regulated facilities; identification of remediation and/or control activities planned or being implemented at regulated facilities; identification of public participation requirements, opportunities and content; and identification of existing or newly identified organized public groups.

Issues requiring long-term strategies to resolve:

None currently identified.

Environmental Management Bureau: The Environmental Management Bureau (EMB) regulates activities governed by the Montana Metal Mine Reclamation Act and the Major Facility Siting Act (MFSA). The EMB coordinates the permitting process for proposed "hard rock" mines and quarries, issues permits when appropriate, inspects permitted mining operations and ensures that disturbed areas are properly reclaimed after mining ends. It also performs environmental reviews for large powerlines, pipelines, conversion and generation facilities proposed under the MFSA.

Collaboration and coordination opportunities with the NPS program include the following:

Mining and facility siting activities, i.e. construction, can have water quality impacts which will need to be incorporated into TMDL calculations. The EMB collects a great quantity of information that is relevant to water quality restoration planning. EMB staff will participate on Watershed Management Team (WMT) and, when appropriate, on the 16-basin TMDL work teams.

Issues requiring long-term strategies to resolve:

Sharing and incorporating information. For example, the TMDL/water quality restoration plan and/or planning process should be addressed in environmental impact statements for hard rock mines and major facility siting.

Industrial & Energy Minerals Bureau: The Industrial & Energy Minerals Bureau is responsible for permitting and regulating all mining and reclamation activities that are related to the prospecting and extraction of coal, uranium, sand, gravel, bentonite, scoria, phosphate and clay. These activities include completing regular inspections of active and inactive permitted mines and ensuring that stormwater permits are obtained for each mine. Collaboration and coordination opportunities with the NPS program:

- Incorporate information collected in permitting process into EnviroNet watershed database. This would include monitoring, groundwater, wildlife and cultural resource information.
- Share information collected for MEPA analysis and TMDL development (e.g. new permits and amendments require cumulative hydrologic impact analysis which is frequently a key element in TMDL development).
- Participation in Watershed Management Team meetings on as-needed basis.

- Participation on DEQ TMDL work teams where bureau activities are related to water quality restoration and protection.

Issues requiring long-term strategies to resolve:

None currently identified.

Community Services Bureau: The Community Services Bureau regulates non-hazardous solid waste management facilities and public drinking water supply or treatment facilities. The bureau assures that the environment is adequately protected from the hazards of waste disposal and that the public health is maintained through a safe and adequate supply of drinking water. These functions are achieved by technical reviews, licensing, certifications, compliance monitoring, training and technical assistance. Waste management facilities include municipal landfills, construction demolition waste landfills and septic tank land application sites. Collaboration and coordination opportunities with the NPS program: .

- Contribute growth trend information to watershed planning process based on anticipated use patterns for wastewaters discharges and water supply.
- Help NPS program identify key areas of water quality concern for preservation (drinking water source) or for mitigation (wastewater inspections).
- Participation on Watershed Management Team and 16-basin TMDL work teams.

Issues requiring long-term strategies to resolve:

Incorporate public water supply monitoring report information into watershed planning and management databases.

Water Protection Bureau: The Water Protection Bureau prevents surface and groundwater pollution by reviewing potential sources of pollution and issuing Montana Pollutant Discharge Elimination System Permits. Collaboration and coordination opportunities with the NPS program:

- Improve coordination on high priority TMDLs where both point and nonpoint sources contribute to waterbody impairment.
- Serve on TMDL work teams and attend Watershed Management Team meetings.
- Coordinate discharger monitoring and baseline information to address information needs and gaps in the watershed planning database (i.e. EnviroNet).

Issues requiring long-term strategies to resolve:

- Integrate stormwater, groundwater, and CAFO permit activities into overall watershed planning framework.
- Update status of 404 permits and FERC licenses in watershed profiles (Montana DEQ WMCP – Volume 2 Watershed Water Quality Planning and Coordination Profiles).
- Increase modeling and assessment capabilities to support MPDES permit process and TMDL development.
- Coordinate the MPDES permits with other components of the watershed framework schedule, such as the monitoring, assessment and TMDL program.

Planning, Prevention & Assistance Division

The Planning, Prevention and Assistance Division develops integrated water, air, waste management and energy plans to protect Montana's environmental resources. The division (PPAD) is responsible for administering Montana's water quality laws and is delegated responsibility for Section 319 of the Federal Clean Water Act.

Monitoring & Data Management Bureau: Monitoring & Data Management Bureau activities include

- Operation of statewide water quality monitoring networks and monitoring databases
- Water quality assessment of lakes, streams, and wetlands and identification of impaired waters
- Water quality modeling and watershed analysis
- Dissemination of monitoring data
- Technical assistance in development of water quality restoration plans and TMDLs
- Training for monitoring and assessment protocols
- Coordination of citizen volunteer water quality monitoring
- Maintenance and calibration of monitoring equipment

Collaboration and coordination opportunities with the NPS program:

- To continue to develop the CWA 305(b) report into an effective watershed assessment and management tool for DEQ programs. The report format has adopted the 8 digit HUC as the base reporting unit to support water quality decision making within the framework's watershed management units.
- To begin organizing monitoring data into a database format that is based on the 8 digit HUC watersheds.
- To develop strategic monitoring plans for watershed management units that address information gaps identified in the watershed profiles and from other sources including the WMT. The rotating monitoring schedule will maximize increased monitoring resources within watersheds on a regular basis (every five years).
- Assessment of water bodies lacking "sufficient credible data" (approximately 486). These waterbodies will be addressed on a watershed basis according to the TMDL schedule (see appendix D).
- Coordinate public 303(d) forums with watershed outreach events scheduled by other DEQ programs participating in the watershed framework.
- Increase the level of access and distribution of environmental monitoring information within DEQ to ensure that permit decisions are well informed by the latest status and trends information. The Blackfoot River is a good case study for how programs will be working together.
- Participate on, and in some cases lead, the 16-basin TMDL workteams.

- Participate on Watershed Management Team.

Issues requiring long-term strategies to resolve:

- Continue to increase the amount of environmental information that is collected by other agencies that is incorporated into the 305(b) report.
- Develop a form of the 305(b) report that can be used by local watershed organizations for watershed planning and management.

Pollution Prevention Bureau: The Pollution Prevention Bureau attempts to prevent water pollution before it occurs through the following activities.

- Delineates sources of water that supply public water supply wells and intakes and assesses potential risks to these source waters
- Assists communities and public water suppliers to develop plans that protect the source waters
- Wetland conservation
- Assists local governments to establish local water quality districts

Collaboration and coordination opportunities with the NPS program:

- Incorporate wetland conservation strategy into watershed framework for priority setting and grant award process.
- Include wetland identification and delineation information into the watershed domain within the Environet database.
- Coordinate public meeting and community outreach on a watershed basis (e.g., Wetlands, SWAP, 319, TMDL, waterbody classifications).
- Coordinate information collection and monitoring between Source Water Protection and other water quality programs including TMDLs.
- Use the watershed framework to better understand the relationship between ground water and surface water systems. Develop a data layer for each 8 digit HUC that identifies areas of interaction between surface water and ground water.
- Coordinate Source Water Protection and Wetland Conservation project priorities with the 319(h) grant program.

Issues requiring long-term strategies to resolve:

- Detailed GIS mapping of the status of wetlands within watersheds to support local watershed planning and management efforts.
- Coordinated participation of programs on local watershed planning and management organizations.

Resource Protection Planning Bureau: The Resource Protection Planning Bureau works with the Monitoring and Data Management Bureau to develop water quality restoration (TMDL) plans. The Resource Protection Bureau is responsible for nonpoint source pollution prevention and the development of water quality standards. Collaboration and coordination opportunities include:

- The bureau's Watershed Management Section will take the lead in organizing and facilitating intra-agency efforts in watershed planning and water quality restoration and prevention activities related to NPS sources.

- Watershed coordinators will, in most cases, serve as team leaders of the 16 DEQ TMDL work teams.
- The Watershed Management Section provides NPS information and educational materials and opportunities to other local, state and federal agencies.
- Close collaboration between the water quality standards and watershed planning sections in TMDL development.
- Use the watershed framework to identify and develop waters requiring site-specific water quality standards and to facilitate the development of site-specific standards. Use watershed forums to improve information and education to public regarding water quality standards.

Issues requiring long-term strategies to resolve:

- Completion of a statewide watershed planning and management information database for all 91 watershed planning areas.
- Creation of citizen advisory groups in each of the 91 watershed planning areas.
- Adequate financial support of watershed planning, monitoring and implementation activities.

Technical & Financial Assistance Bureau: The Technical & Financial Assistance Bureau provides low interest loan financing for drinking water and wastewater infrastructure projects and eligible nonpoint source pollution control and facilitates communication between DEQ and other state, federal, and local governments regarding environmental regulatory issues. Collaboration and coordination opportunities with the NPS program include the following:

- State Revolving Fund (SRF): promote awareness of SRF opportunities to address NPS pollution.
- SRF collaborate on monitoring and assessment to identify areas of water quality concern, and develop a shared priority ranking system for evaluating SRF projects with priorities from other agencies and programs.
- SRF programs work with Resource Protection Planning Bureau to develop NPS applications of SRF funding.
- SRF loans used for implementation of BMPs in approved water quality restoration plans.
- Develop, demonstrate and publicize alternative energy systems for pumping irrigation water and providing off-stream livestock water.

Issues requiring long-term strategies to resolve:

- Participate in assessment activities to identify areas of impaired water quality for the purpose of proactively targeting the area for information and education activities regarding SRF opportunities.
- Integrate Intended Use Plan and Project Priority List with other statewide watershed reporting components.

Remediation Division

The Remediation Division strives to protect human health and the environment by preventing potential exposure to hazardous or deleterious substances that have been released to soil, sediment, surface water, or groundwater. Activities include:

- Investigation and cleanup of state and federal Superfund sites
- Reclamation and remediation of abandoned mine lands
- Implementation of corrective actions at sites with leaking underground storage tanks (USTs)
- Remediate groundwater contaminated by agricultural chemical spills, petroleum spills, or other improper placement of wastes

Collaboration and coordination opportunities with the NPS program:

- Mine Waste Cleanup Bureau to share information from the statewide priority list for mine cleanup. Information includes estimates of volumes of stormwater runoff during construction phase that could be used for TMDL development.
- Possible opportunities for public notice and education for public meetings associated with the cleanup process.
- The RCRA facilities have monitoring requirements that include groundwater and other parameters that are considered appropriate for the location. The monitoring requirements and collected information (e.g., RCRIS, RCINFO, annual site reports) will be included in the watershed domain of the Environet database. Groundwater gradient and depth information could be useful in the Source Water Assessments.
- Facility corrective actions are assessment based and are logically connected to other mitigation activities that are being undertaken within the watershed management unit. The corrective actions could be considered in the context of an overall watershed recovery action strategy.
- Superfund has sites in many watersheds that are water supply watersheds and / or are listed on the 303(d) list of impaired waters. The Mine Waste Clean-up Bureau conducts risk assessments to identify potentially affected aquatic resources that could be useful to a watershed water quality planning and management process.
- Proposed drinking water sites and new growth/subdivision information could affect the Superfund priority list.
- Superfund program needs baseline information for their sites to determine what background conditions were prior to contamination, leading to better informed cleanup objectives.

Issues requiring long-term strategies to resolve:

None currently identified.

4.1.2 Department of Natural Resources and Conservation

The mission of the Montana Department of Natural Resources and Conservation (DNRC) is to help ensure that Montana's land and water resources provide benefits for present and future generations. Many of the programs and activities within DNRC affect management of water quality

within Montana's watersheds. http://www.dnrc.state.mt.us/

The **Conservation and Resource Development Division** assists individuals and local governments with natural resource management concerns and finances conservation, resource management, and technical activities. It also provides financial and technical assistance for watershed management and pollution prevention projects conducted by Montana's 58 conservation districts. This division is a strong supporter of conservation activities, water quality and upland and streamside management and protection. A strong partnership has developed between this division, conservation districts, USDA, NRCS, and watershed groups. Grant and loan programs include Conservation District Administrative Grants, Conservation District "HB223" Grants, Education Mini-Grants, Reclamation & Development Grants, Renewable Resource Grants, Renewable Resource Project Planning Grants, Riparian/Wetlands Educational Grant Program, Watershed Planning Assistance Emergency Grants and Loans, Renewable Resource Loans, Range Improvement Loans, Private Water Development Loans, Drinking Water State Revolving Fund Loans and Water Pollution Control State Revolving Fund Loans.

The **Forestry Division**, headquartered in Missoula, is responsible for planning and implementing forestry programs through a network of field offices. The Forestry Division has two major functions: fire and aviation management and service forestry. The Service Forestry function provides services to various client groups to help them comply with State forestry laws and achieve their own forestry-related objectives. Services are delivered to individuals, local governments, corporations, other agencies, and the general public. Services include administering the BMP notification, hazard reduction, and stream side management laws; providing information on Forestry Best Management Practices; offering technical advice, education and cost-share assistance for private forest management; comprehensive management of Montana's community forest resources through programming, technical, and financial assistance; detecting and controlling insect and diseases; and producing forest plants for conservation plantings and reforestation.

The **Trust Land Management Division** administers and manages the state trust timber, surface, and mineral resources for the benefit of the common schools and the other endowed institutions in Montana. The division is divided into four bureaus: Agriculture and Grazing Management, Forest Management, Minerals Management, and Special Use Management. The department's obligation is to obtain the greatest benefit for the school trusts. The greatest monetary return must be weighed against the long-term productivity of the land to ensure continued future returns to the trusts.

Within the **Water Resources Division**, the Water Management, Water Rights, and Water Operations Bureaus provide expertise for surface water hydrology issues, floodplain management, water allocation, and dam safety, assist with watershed planning, drought planning & management and collect water flow data. This division also supports eight regional offices that provide program support to citizens in local watersheds. Responsibility of state water plan development lies in with this division. The state water plan has been used to recognize and adopt local watershed plans as part of the state water plan.

With these programs opportunities exist for DNRC to coordinate and collaborate with local groups and organizations and other agencies within the watershed framework. These opportunities may include the following:

- Watershed Planning
- Water management. Water allocation, and Drought planning

- Floodplain delineation management and mitigation
- Forest Practices
- Forestry BMP's and operations within Streamside Management Zones
- Educational programs on land management, grazing, streamside management forestry, and water use.
- Collection of water quality, water resource and land use data from State owned school trust lands.
- Cooperative watershed assessment, planning and restoration activities in watersheds containing school trust lands intermixed with other agencies and landowners groups.

For additional information, contact:

Gary Frank, Hydrologist, Forest Management Bureau, Trust Lands Division, 406 542-4328

Chris Tootell, Bureau Chief, Service Forestry Bureau, Forestry Division, 406 542-4303

Steve Schmitz, Bureau Chief, Conservation District Bureau, CARRD, 406 444-6691

Richard Moy, Bureau Chief, Water Management, Water Resources Division, 406 444-6633

4.1.3 Department of Fish, Wildlife, and Parks

Montana's Department of Fish, Wildlife, and Parks (MFWP) manages the state's resources not only for recreational uses such as fishing and hunting but also for protection of open space, wilderness, and habitat for non-game species. The department achieves these goals by regulating fishing and hunting, managing wildlife management areas, and maintaining a network of state parks. The MFWP has many activities and programs that contribute to the stewardship of watershed health and water quality in Montana including:

The **Montana Rivers Information System** (MRIS) is a database containing information on fish species distribution, supporting distribution data (e.g., population trends, spawning survey results, and genetics data), and stream level information for over 4,500 streams and rivers (e.g., angling use, fisheries resource classification, protected designation, instream flow reservations, stream channel conditions).

The **Fisheries Division** provides technical assistance for managing endangered and threatened aquatic species, protecting and restoring aquatic habitat, protecting and restoring native fish populations, and controlling pollution. In order to provide this assistance, the staff of the Fishery Division

- Monitors and researches fish populations and habitat condition
- Participates in land use decisions with local, state, and federal agencies
- Assists private landowners, agencies, and organizations with habitat protection and restoration efforts
- Manages water flows in streams and water levels in lakes and reservoirs
- Administers the Stream Protection Act (124 Permits) and, with the Conservation Districts, implements the Streambed Protection Act of 1975 (310 Permits)

The **Wildlife Division** administers the Montana Migratory Game Bird Stamp Program. This statewide program is funded by the sale of Montana Migratory Game Bird Stamps

and associated art. At this time, about $200,000 per year is available for wetland development projects. The emphasis is on wetland habitat projects that will increase waterfowl production and brood survival. Sites with adequate nesting cover near wetlands receive priority and typically, this includes large blocks of native or introduced grasses/legumes. Eligible practices include restoring drained wetlands, constructing new reservoirs, repairing breached dams or damaged spillways, installing water control structures, establishing suitable upland nesting cover, and working with landowners to implement managed grazing systems. Tom Hinz, (406) 444-3248, thinz@state.mt.us.

MFWP has designated a pollution control biologist to facilitate interagency coordination regarding activities with implications to fishery resources. Examples of opportunities for the MFWP to collaborate and coordinate with other agencies, organizations, and individuals include the following:

- Collaborate with local watershed groups to accommodate watershed restoration goals that benefit water quality and fishery resources
- In partnership with the Department of Environmental Quality, coordinate all water pollution activities including investigation of fish kills and other activities that have implications to fish resources and water quality

For additional information contact Glen Phillips (406) 444-5334.

4.1.4 Department of Agriculture

The Montana Department of Agriculture is charged with the mission to protect, enhance, and develop all agriculture in Montana; to encourage and promote production and marketing for agriculture and allied industries; and to provide protection for producers and consumers through administration and enforcement of statutes established by Montana's legislature. The Department is composed of three divisions: the Agricultural Development Division, the Agricultural Sciences Division, and the Central Management Division. While serving Montana's agriculture, the department strives to protect the health of the environment and the state's citizens. The Department of Agriculture has many activities and programs that contribute to the stewardship of watershed health and water quality in Montana including the following:

- Pesticide Management Program (Montana Pesticide Act, 80-8-101 et. seq., MCA): The proper use of pesticides is regulated by licensing pesticide applicators and dealers, registering pesticide products, certifying and training pesticide applicators and dealers, and enforcing pesticide laws and regulations.
- Pesticide users are informed about the protection of threatened or endangered species from the use of pesticides.
- Groundwater Management Program: Technical expertise and education is offered for protecting groundwater resources. These activities assess the presence of pesticides and fertilizers, track concentration and trends of pesticides and fertilizers found in water resources and manage pesticides for the protection of water resources.
- Montana has designated several aquatic pesticides as restricted use requiring that individuals wishing to use these pesticides obtain an aquatic pesticide license and attend additional training.

Opportunities for collaboration and coordination with the Department of Agriculture include the following:

- Working with other agencies on cooperative water resource projects that include pesticide/fertilizer related sampling and monitoring including EPA, DEQ, MBMG, USGS, communities and local units of government.
- MDA also works cooperatively with private industry to conduct pesticide specific and/or site-specific sampling and monitoring to support pesticide registration/reregistration.
- MDA assists other agencies, units of government, communities, individuals and groups conducting or interested in conducting sampling and monitoring of water resources by providing technical assistance in sampling/monitoring design, well selection, analyte selection and laboratory analyses interpretation.

For additional information, please contact Donna Rise or Dan Sullivan at (406) 444-5400.

4.1.5 Department of Transportation

The mission of the Montana Department of Transportation (MDT) is to serve the public by establishing a transportation system that emphasizes safety, environmental preservation, cost effectiveness and quality. This work includes managing the state motor pool, maintaining highways, bridges and rest areas, planning for public transportation, rail systems, and airports, and administering highway traffic safety. The Department of Transportation has many activities and programs that contribute to the stewardship of watersheds and water quality in Montana including the following:

- Investigations for threatened, endangered species, and species of special concern along highway corridors.
- Wetland determinations, delineations, and mitigation projects
- General wildlife and fisheries surveys
- Processing of Section 404 Clean Water Act and Montana Stream Protection Act (SPA 124) permit applications
- Groundwater monitoring and remediation as it pertains to Underground Storage Tanks (USTs) at MDT owned properties.
- Underground Storage Tanks
- Implementation of construction BMPs
- Establishment of wetland construction guidelines for the reclamation of borrow pits that have been adopted by the DEQ's Mine Waste Cleanup Bureau
- Development of a functional assessment method for characterizing wetlands

Opportunities for collaboration and coordination with MDT include the following:

- Since 1995, the MDT has created 27 wetland mitigation sites totaling approximately 400 acres. The MDT is required to coordinate with a variety of federal, tribal and state agencies to develop mitigation sites on both public and private lands for impacts associated with transportation projects. The majority of these projects are either restoration or creation efforts and involve everything from financial assistance, to planning, design and construction of the sites. The MDT has also participated in cooperative projects with a number of non-profit conservation organizations, tribal and federal agencies to jointly develop wetland and stream restoration projects.

- MDT provides research funds for environmental studies as they relate to transportation issues.
- Groups conducting watershed assessments may access MDT's data collected in the course of monitoring wetland mitigation projects concerning water quality, vegetational communities, and wildlife populations, as it pertains to specific mitigation sites and hydrologic data as it pertains to highway stream crossings.
- MDT may share technical expertise and experience with wetland restoration with interested groups and individuals.
- MDT will fund a position in DEQ's Resource Protection Planning Bureau to work on TMDL development related to transportation impacts. Water quality impairments caused by past transportation projects will be identified and addressed.

For further information, please contact Lawrence J. Urban, (406) 444-6224, lurban@state.mt.us.

4.1.6 Department of Justice

Through a 1998 partial settlement of its natural resource damage lawsuit, Montana v. ARCO, the State of Montana obtained approximately $130 million for restoration or replacement of the injured natural resources and lost services in the Upper Clark Fork River Basin that were covered in the lawsuit. These injured natural resources include: 1) injured groundwater resources - the loss of over 600,000 acre-feet in the Butte, Anaconda, Rocker, and Milltown areas; 2) injured aquatic resources - the loss of the fishery in Silver Bow Creek and impairment of the fishery in the Clark Fork River to 1/5 of its baseline; and 3) injured terrestrial resources – the loss of 1000 acres of wildlife habitat and wildlife in riparian areas of Silver Bow Creek and the Clark Fork River, 3400 acres of riparian habitat in Opportunity ponds, and a loss of upland wildlife and wildlife habitat in the Anaconda uplands. Examples of lost services that were provided by these injured resources include hunting, fishing, observing wildlife, hiking, and bird watching.

In 2000, the Department of Justice Natural Resource Damage Program initiated an annual grant program using these settlement monies. The framework for the grant program is provided in the State's February *2000 Upper Clark Fork River Basin Restoration Plan Procedures and Criteria*. Governmental entities, private individuals and private entities may apply for Restoration Fund Grants. Projects must be located in the Upper Clark Fork River Basin, from the headwaters near Butte downstream to and including the Milltown Reservoir just upstream of the City of Missoula. A limited exception exists for projects that would restore native trout that cannot from a practical and economic standpoint be restored in the Upper Clark Fork River Basin; those projects may be located in the Big Blackfoot River Basin. Three types of projects are eligible for grant funding:

- Restoration projects that will restore or replace the equivalent of injured natural resources and/or the services lost as result of releases of hazardous substances by ARCO or its predecessors that were the subject of the Montana v. ARCO lawsuit. Restoration actions operate directly on the injured resources and services to return them to baseline conditions or to accelerate the recovery process. Replacement actions create or enhance resources and services equivalent or similar to those that have been injured but are located away from the immediate site of injury.

- Planning projects that involve developing future grant proposals. Funding for project development grants is designed to promote the development of project proposals from entities with sound restoration ideas that do not have funds available to develop those ideas.
- Monitoring and Research projects that pertain to restoration of natural resources in the UCFRB.

Examples of possible eligible projects within the basin include:

- Removing tailings that cause surface water contamination and/or groundwater contamination.
- Treating contaminated groundwater.
- Reconstructing stream channels to create or enhance aquatic habitat.
- Using management techniques such as grazing and irrigation management in injured areas to create favorable conditions for recovery.
- Planting native trees and shrubs in riparian and upland areas to create or enhance wildlife habitat.
- Acquiring unimpaired riparian and upland wildlife habitat, such as acquisition of wetlands.
- Creating or enhancing recreational facilities such as trails and campgrounds.
- Constructing a reservoir to supply drinking water needs.
- Acquiring instream flows to improve surface water quality.

Applications received for Pilot Year 2000 funding include projects involving conservation easements and land acquisitions; revegetation/weed management; best management practices for wetland enhancement; watershed planning, modeling, and monitoring; research; and a recreational corridor development.

For more information on Upper Clark Fork River Basin Restoration Grants, see the Montana Department of Justice website (www.doj.state.mt.us) or contact Carol Fox at the Natural Resource Damage Program, 406-444-0205.

4.1.7 Montana Water Center

The Montana University System Water Center was established by an act of Congress in 1964. It is one of 54 centers known collectively as the National Institutes for Water Resources. The Center is located on the campus of Montana State University-Bozeman where the director and 11 permanent employees and 5 students coordinate programs. Associate Directors at the University of Montana –Missoula and –Butte campuses complete the Center's *"University System"* network. Ad hoc committees and multi-disciplinary teams are brought together for specific projects as needed. The mission of the center is to:

- Support and prioritize **water research** in Montana.
- Provide **training and education** for current and future water professionals
- Promote **problem-solving partnerships** among higher education, government, and the private sector to respond to water-related challenges and training needs.

- Serve as a clearinghouse for Montana water information.

Current Water Center programs include:

The **Small Systems Technical Assistance Center** that provides technical, educational and training assistance to small public water systems

The **Ecosystem Restoration Project**, a national website which focuses on reclamation and restoration of the nation's forests, decomissioned roads, wetlands, abandoned minelands, and other vital environments. This project is a collaboration of the Water Center and the U. S. Forest Service, the U.S. Environmental Protection Agency, the Montana Department of Environmental Quality, and the Bureau of Land Management.

The **Montana Water** website, a source for watershed and water quality information in Montana. The Montana Water website provides a directory of watershed groups as well as a directory of expertise in federal, state and local agencies and private organizations. The Montana Water Website provides information about the Montana Watershed Coordination Council. The site also posts articles on Montana water issues from other websites and publications.

The **Water Resources Research Program** Annual funding from the US Geological Survey provides seed grants for research and education projects at Montana's universities.

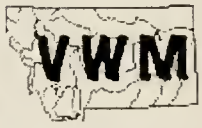
The **Whirling Disease Initiative** which includes a fisheries laboratory at MSU-Bozeman. The Initiative selects and coordinates more than $500,000 in research each year.

Opportunities for coordination and collaboration include:

- Continue to serve as a clearinghouse for watershed and water quality information.
- Provide training to watershed and conservation district leaders and staff.
- Help build working partnerships between citizens and nonprofit organizations and local, state and federal agencies.
- Assist in finding resources for water quality research.

For more information see http://water.montana.edu/default.htm

4.1.8 Montana Volunteer Water Monitoring Project



The Montana Volunteer Water Monitoring Project employs a non-advocacy approach in teaching water quality and water monitoring procedures, focusing on providing citizens with tools and training so that they may make informed decisions regarding local water quality issues. Consequently, participants are encouraged to work in a positive manner and to build bridges within their communities whenever possible. The information gathered by participants in the Project is for educational purposes and to increase awareness and enhance stewardship of Montana's water resources. Additionally, it is a starting point for individuals to gather baseline information about their streams and rivers. Realizing that data collection is a byproduct of this project, participants have the option of sending their data via the Internet to a central repository at the Natural Resource Information System (NRIS) in Helena.

By becoming more knowledgeable about the complex world of water quality, a constituency of educated stewards becomes an essential component in the management and protection of Montana's water resources.

Opportunities for coordination and collaboration:

Provide water monitoring training and information to local watershed groups developing TMDLs and water quality restoration plans.

For more information see: http://www.nris.state.mt.us/wis/volwatmon.htm

4.2 Federal Agencies

4.2.1 Bureau of Land Management

The Bureau of Land Management (BLM), an agency within the U.S. Department of the Interior, administers 264 million acres of America's public lands, located primarily in the 12 Western States. The BLM sustains the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM lands in Montana vary from open prairies in the east to rugged mountains in the west. The BLM manages about eight million acres in Montana scattered throughout the state. These lands provide habitat for wildlife, forage for domestic livestock, riparian areas that help improve water quality in rivers and streams, and forest products ranging from Christmas trees to commercial timber. Much of the BLM land in Montana is relatively remote, providing vast areas in which people may enjoy solitude and recreation. Between 1994 and 1999, recreational visits to public lands increased by 143 percent. BLM administers the 149 mile Upper Missouri National Wild and Scenic River as well as twelve miles of the Blackfoot River Corridor.

The BLM manages the vast federal mineral estate in Montana. Prudent management of energy minerals— coal, oil and gas— is an important BLM program. There are significant oil and gas fields in the Williston Basin area in eastern Montana and in the general vicinity of Great Falls. Some of the nation's largest coal deposits lie beneath the prairies of eastern Montana and western North Dakota.

Abandoned mines pose a particular challenge to the BLM in Montana, where 19th-century mining spurred settlement by pioneers. Over the years, companies and prospectors have abandoned many early mining sites, leaving scars on the land that nature has been unable to heal. Many of these sites— generally referred to as Abandoned Mine Lands— continue to pollute water, as heavy metals and other by-products leach into streams flowing through valleys long since stripped of their bounty. Since 1997, BLM-Montana has taken part in a pilot project to clean up these sites. Using funds earmarked for this project, the BLM has developed a partnership with the Department of Environmental Quality and other federal agencies to clean up entire watersheds. Approaching these reclamation projects on a watershed basis is the most sensible way to deal with this problem, since pollution of this type affects the land and downstream water users. Doing the entire job at one time is also much more cost-effective and helps the BLM leverage available funding with its partners. Working cooperatively, BLM-Montana has been able to multiply its original funding fivefold, producing substantial on-the-ground results.

The three BLM Montana district offices in Miles City, Butte and Lewistown have adopted standards for rangeland health and guidelines for livestock grazing management. These

standards address watershed functioning, water quality and wildlife habitat. The guidelines are best management practices, treatments, and techniques and implementation of range improvements that will help achieve the standards.

Coordination and collaboration opportunities include the following:

- Implementation of forestry and grazing BMPs.
- Evaluation of BMP effectiveness.
- Management of recreational areas and uses
- Reclamation of abandoned mine lands
- Management of transportation routes
- Management of special plant and animal species
- Management of mineral development
- Management of wildlife habitat
- Management of noxious weeds
- Participation in the development of TMDLs and water quality restoration plans in watersheds where BLM is a significant resource manager.

For additional information, please contact Tim Bozorth (406) 896-5041.

4.2.2 US Forest Service

The US Forest Service is a part of the US Department of Agriculture. When the Forest Service began the lands were called Forest Reserves. Maintaining conditions of favorable flow from these lands was one of the primary objectives envisioned when the first Forest Reserves were established in the late 1800's. The name "forest reserve" gave way to "national forest" in 1905 and the lands were transferred from the Department of the Interior to the Department of Agriculture. Maintaining conditions of favorable flows remained one of the primary objectives of what grew into the present day National Forest System. Today there are over 150 National Forests in the United States with nine in Montana. All land management activities on these lands are the responsibility of the USDA Forest Service. The Forest Service uses a land management planning process with public involvement to determine the best use of all the resources. These include management of roads, fire, recreation, fish and wildlife habitat, timber, minerals, range, wilderness, heritage resources, and watersheds.

Watershed management remains a primary objective of the National Forest System. Activities include:

Watershed Restoration Planning and Implementation: The USDA Forest Service is responsible for prioritizing watersheds based upon needs, development of watershed restoration plans and implementation of those plans. The agency has become active with State Agencies, Soil and Water Conservation Districts and local watershed coordination groups to encourage proper treatment of entire watersheds. This effort needs to be continued and expanded to meet the increasing expectations of the American public and the legal mandates of the Clean Water Act.

Environmental Education: Environmental education programs are offered for local schools and other interested groups.

Abandoned Mine Reclamation: In coordination with the Montana State Abandoned Mines Program, the USDA Forest Service prepares joint engineering and cost analyses, conducts primary responsible party searches, plans and implements site remediation activities.

Road Management: The USDA Forest Service has undertaken an aggressive program of road inventory and problem identification. The Forest Planning process will develop overall transportation management direction.

Opportunities to coordinate and collaborate with the USFS include the following:

- Participating in TMDL development and water quality restoration planning and protection efforts in watersheds significantly impacted by Forest Service lands and activities.
- Providing technical and financial assistance with water quality and habitat protection and restoration projects
- Sharing data collected in support of land and resource management plans such as hydrology and soils surveys and wetlands inventories
- Incorporating measures into timber harvest plans that minimize impacts to water quality
- Continued participation in and support of Forestry BMP audit program.

For additional information, please contact Bruce Simms (406) 329-3447.

4.2.3 Fish and Wildlife Service

The U.S. Fish and Wildlife Service is part of the Department of the Interior. The Service is responsible for carrying out Federal laws and programs that conserve, protect, and enhance fish, wildlife, plants and their habitats. The Service's major responsibilities are for migratory birds, endangered species, some marine mammals, and freshwater and anadromous fish. The Service manages the National Wildlife Refuge System and operates National Fish Hatcheries. The Service also administers the Federal Aid in Sport Fish and Wildlife Programs, which distribute excise tax revenues from sales of hunting and fishing equipment and motorboat fuels to States for fish and wildlife restoration. Montana has seven staffed National Wildlife Refuges (NWRs) and five Wetland Management Districts (WMDs): Benton Lake NWR and WMD, Bowdoin NWR and WMD, Charles M. Russell NWR and WMD, Lee Metcalf NWR, Medicine Lake NWR and WMD, National Bison Range, Northwest Montana WMD, and Red Rock Lakes NWR.

The USFWS has many activities and programs that contribute to the stewardship of watersheds and water quality in Montana including the following:

North American Waterfowl Management Plan (NAWMP): NAWMP is an international effort to reverse waterfowl population declines in North America. Under this plan, U.S., Canadian, and Mexican partners agreed to pool their resources to conserve millions of acres of waterfowl habitat in specific joint venture areas deemed critical to waterfowl. The joint ventures have primarily tried to pursue non-regulatory strategies that can be implemented through voluntary and cooperative actions. All agencies, groups, or individuals having interests in wetlands, waterfowl, other wetland wildlife, soil and water conservation, and sustainable resource use are encouraged to join these partnerships. Two

such ventures currently are in effect in Montana; the Prairie Pothole Joint Venture (PPJV) and the Intermountain West Joint Venture (IWJV). The PPJV in Montana has three project focus areas. These are Northeastern Montana (Sheridan, Daniels, and Roosevelt counties), Beaver Creek (Phillips, Valley, and Blaine counties), and Five Valleys (Flathead, Lake, Powell, Granite, and Missoula counties). The North American Wetland Conservation Act (NAWCA) is the principal funding source for the NAWMP. The Act created the North American Wetlands Conservation Fund designed to help support projects on public and private lands. A nine-member council is established to review annual project proposals submitted by partners for funding under the Act. Projects that fall within established Joint Ventures receive highest priority. James Stutzman, (406) 727-7400 x 24.

Partners for Fish and Wildlife Program: Partners for Fish and Wildlife is the U.S. Fish and Wildlife Service's private lands program. The program provides funding and technical assistance to private landowners interested in fish and wildlife habitat projects on their land. Projects are evaluated from a biological and cost/benefit standpoint. The program is strictly voluntary. Initially, PFW focused exclusively on wetland habitat work, but since 1992 instream and riparian restoration, grazing management, native and prairie restoration, fish and wildlife - friendly irrigation systems, and a myriad of other projects are also eligible. Montana focus areas include the Blackfoot Valley, Rocky Mountain Front, Northeastern Montana, Beaver Creek, Mission Valley, and Centennial Valley. James Stutzman, (406) 727-7400 x 24.

Emergency Wetlands Resources Act. The purpose of the Emergency Wetland Resources Act of 1986 is to "promote the conservation of migratory waterfowl and to offset or prevent the serious loss of wetlands by the acquisition of wetlands and other essential habitat, and for other purposes". Under the act, the U.S. Fish and Wildlife Service (FWS) has developed a National Wetlands Priority Conservation Plan (NWPCP) to identify the locations and types of wetlands that should be priorities for state and federal acquisition through the Land and Water Conservation Fund Act (LWCF). The NWCPC may result in acquisition of "priority" wetlands that provide a high degree of public benefit, are representative of rare or declining wetlands types within an ecoregion, and are subject to identifiable threat of loss or degradation. The functions and values of wetlands, as well as historical and potential wetland loss, are criteria for determining acquisition priorities. The Act requires that each state consider wetlands an important outdoor recreational resource in preparing the State Comprehensive Outdoor Recreation Plan (SCORP) required under the Land and Water Conservation Fund Act. The wetlands component of SCORP's must be consistent with the national plan. FWS uses the state wetlands component of SCORP in preparing its regional Wetlands Concept Plans. Wetlands Coordinator, (303) 236-2985.

Fish and Wildlife Coordination Act The Fish and Wildlife Coordination Act (FWCA) provides a key role for states in evaluating the impacts of water resources development projects (such as dam construction or reclamation projects) on fish and wildlife and Clean Water Act Sections 402 and 404 permits. The goals of the evaluation are to assess the status of affected fish and wildlife resources and to prevent or mitigate their loss and damage. The Act can be used to protect wetlands that are important to fish and wildlife conservation. However, the mitigation reports are only advisory to the lead federal agency, which is not required to follow their recommendations.

National Wetland Inventory The National Wetland Inventory (NWI) program is responsible for identifying, classifying, mapping, and reporting on the status of wetlands of the United States. The primary objectives of the NWI program are to develop and distribute scientific information on the extent and characteristics of U.S. wetlands and

produce wetland maps that accurately represent these resources. Chuck Elliot, (303) 236-7400 x 257.

The USFWS may coordinate and collaborate with other agencies, organizations, and individuals by providing data and financial or technical assistance to land owners and local agencies with habitat protection and restoration projects.

For additional information, please contact Rob Hazelwood (406) 449-5225.

4.2.4 Natural Resources Conservation Service

The Natural Resources Conservation Service is a Federal agency that works in partnership with the American people to conserve and sustain our natural resources on private lands.

The NRCS has many activities and programs that contribute to the stewardship of watersheds and water quality in Montana:

Emergency Watershed Program/Floodplain Easement Program: This program works through local government sponsors and helps participants solve natural resource and related economic problems on a watershed basis. Projects include floodplain protection, watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Technical and financial assistance is available for installation of works of improvement to protect, develop, and utilize the land and water resources in small watersheds. D. James Suit, PE (406) 587-6822 or David Heilig, Floodplain Easements (406) 587-6789.

Environmental Quality Incentives Program (EQIP): The Environmental Quality Incentives Program (EQIP) provides technical, financial, and educational assistance to farmers and ranchers who volunteer to address significant natural resources concerns. Half of the funds are targeted to livestock-related natural resource concerns and the other half to other natural resource priorities. Approximately 65% of EQIP funding is available for priority areas and 35% is available to natural resource concerns and objectives outside priority areas. Dennis Loreth, (406) 587-6795, dloreth@mt.nrcs.usda.gov.

Farmland Protection Program – The Farmland Protection Program (FPP) is a voluntary program that helps farmers keep their land in agriculture. The program provides funding to State, local, or tribal entities with existing farmland protection programs to purchase conservation easements or other interests. The goal of the program is to protect between 170,000 and 340,000 acres of farmland nationwide.

Resource Conservation and Development Program (RC&D): The Resource Conservation and Development Program was created to help local citizens address problems in their areas by bringing together a cross section of local leaders with a variety of knowledge, expertise, and experience. Montana currently has seven RC&D areas - Beartooth RC&D, Northwest Regional RC&D, North Central RC&D, Headwaters RC&D, Bitterroot RC&D, Eastern Plains RC&D, and Central RC&D. The goal of RC&D is to encourage skilled, focused leadership which facilitates the coordination and wise use of all human and natural resources in Montana. Ted Dodge, (406) 587-6965 or David Heilig, RC&D Program Manager (406) 587-6789.

Forest Stewardship (FSP) and Stewardship Incentive Program (SIP): These programs are intended to provide technical and financial assistance to non-industrial private forest landowners who own 10 to 1000 acres (5000 acres with a waiver) of forest land, which

they want to protect and enhance along with the associated wetlands and wildlife habitat. The FSP offers technical assistance to landowners for developing a Forest Stewardship Plan that addresses all natural resource concerns on the property. In Montana, the FSP provides landowners with a training workshop that gives them background to develop their own management plan if they wish. SIP provides financial cost share assistance to landowners who choose to have the management plan developed by other resource professionals, including support for implementing practices specified in the plan. Robert Logar (406) 587-6836, bobl@mst.nrcs.usda.gov.

Intermountain Riparian/Wetland Resource Technical Team: The Intermountain Riparian/Wetland Resource Technical Team works in Colorado, Wyoming, and Montana. The team is involved with riparian and wetland technology development and transfer through bioengineering training sessions, riparian ecology training and management. The team also provides training opportunities while completing riparian assessments for field office and conservation district personnel. The team is also working on development of hydrogeomorphic models for riverine, low gradient, fine substrate systems and other wetland types. Sandra Wyman (406) 587-6924 swyman@mt.nrcs.usda.gov

Swampbuster/Wetland Conservation Provisions: Swampbuster discourages the conversion of wetlands on agricultural land by denying federal farm benefits to farmers who drain wetlands. This program helps preserve the environmental functions and values of wetlands, including flood control, sediment control, groundwater recharge, water quality, wildlife habitat, recreation, and esthetics. NRCS provides certified wetland determinations. Landowners have opportunities to work with USDA, conservation districts, or others to choose the best ways to mitigate wetlands. Dave Heilig, (406) 587-6789, dheilig@mt.nrcs.usda.gov.

Wetland Reserve Program (WRP): The Wetlands Reserve Program (WRP) is a voluntary program to restore and protect wetlands on private property. WRP provides landowners with financial incentives to enhance wetlands in exchange for retiring marginal agricultural land. Landowners may sell a conservation easement or enter into a cost-share restoration agreement. Landowners voluntarily limit future use of the land, yet retain private ownership. Landowners and the NRCS develop a plan for the restoration and maintenance of the wetland. Dave Heilig, (406) 587-6789, dheilig@mt.nrcs.usda.gov.

Wildlife Habitat Incentives Program (WHIP): The Wildlife Habitat Incentives Program is a voluntary program for people who want to develop both technical assistance and cost sharing to help establish and improve fish and wildlife habitat. Participants work with USDA's Natural Resources Conservation Service to prepare a wildlife habitat development plan in consultation with the local conservation district. The plan describes the landowner's goals for improving wildlife habitat, includes a list of practices and a schedule for installing them. It also details the steps necessary to maintain habitat for the life of the agreement. Dennis Loreth, (406) 587-6795, dloreth@mt.nrcs.usda.gov

Montana Natural Heritage Program (MTHNP): The Montana Natural Heritage Program (MTNHP) is a centralized repository of information on biologically significant features in Montana, emphasizing species and natural communities that are sensitive, threatened, endangered, or in need of further research. MTNHP is in the process of compiling information on wetlands of high conservation or mitigation value.

Coordination and collaboration opportunities include the following:

- Funding for projects conducted by landowners, conservation districts, and watershed groups
- Technical assistance for projects conducted by landowners, conservation districts, and watershed groups

For additional information, please contact Dave Heilig, (406) 587-6789.

4.2.5 Farm Services Agency

The Farm Service Agency (FSA) of the U.S. Department of Agriculture ensures the well-being of American agriculture, the environment and the American public through efficient and equitable administration of farm commodity programs; farm ownership, operating and emergency loans; conservation and environmental programs; emergency and disaster assistance; domestic and international food assistance and international export credit programs. These programs provide a safety net to help farmers produce an adequate food supply, maintain viable operations, compete for export sales of commodities in the world marketplace, and contribute to the year-round availability of a variety of low-cost, safe, and nutritious foods. FSA enhances the environment by the development and implementation of programs to ensure adequate protection of natural, cultural, and historic resources. For example, the Conservation Reserve Program is a voluntary program that offers annual rental payments and cost-share assistance to establish long-term resource-conserving covers on eligible land.

FSA programs and activities that contribute to the stewardship of watershed health and water quality include the following:

Conservation Reserve Program (CRP): CRP is a voluntary program that offers annual rental payments, incentive payments for certain activities, and cost-share assistance to establish approved cover on eligible cropland. The program encourages farmers to plant long-term resource-conserving covers to improve soil, water, and wildlife resources. Contract duration is between 10 and 15 years. Special environmental priority practices installed on cropland, such as, grassed waterways, shelterbelts, field windbreaks, living snow fences, contour grass strips, salt tolerant vegetation, shallow water areas for wildlife, and filter strips, are available. Eligible acreage adjacent and parallel to streams devoted to riparian buffers planted to trees may also be enrolled. CRP is administered through local county Farm Service Offices. Contact: Glenn Patrick (406) 587-6880

Emergency Conservation Program (ECP): ECP provides emergency funding for farmers and ranchers to rehabilitate farmland damaged by wind erosion, floods, hurricanes, or other natural disasters, and for carrying out emergency water conservation measures during periods of severe drought. The natural disaster must create new conservation problems. Conservation problems existing prior to the disaster are not eligible for cost-share assistance. Implementation of the program is subject to availability of funds, which are appropriated by Congress. County FSA committees set cost-share levels up to 64 percent. Eligibility for ECP assistance is determined by county FSA committees based on individual on-site inspections, taking into account the type and extent of damage. Emergency practices to rehabilitate farmland damaged by wind erosion and other disasters, including drought, may include debris removal, providing water for livestock, fence restoration, grading and shaping of farmland, restoring conservation structures, and water conservation measures. Contact: Leonard McArthur (406) 587-6882

Opportunities for the FSA to coordinate and collaborate with other agencies, organizations, and individuals include the following:

- Providing financial assistance to farmers for conservation measures
- Providing technical assistance (e.g., a landowner guide) for selecting and implementing appropriate conservation techniques and practices

For additional information please contact Glen Patrick (406) 587-6880.

4.2.6 Bureau of Reclamation

The US Bureau of Reclamation (BOR) is a contemporary water management agency that helps the Western States, Native American Tribes and others meet new water needs and balance the multitude of competing uses of water in the West. Reclamation strives to meet the increasing water demands of the West while protecting the environment and the public's investment in these structures. Reclamation achieves these goals by emphasizing water conservation, recycling and reuse as well as developing partnerships with our customers, states, and Native American groups. For years Reclamation has been working with water user groups, other Federal, state and local agencies and interest groups to provide increased benefits from water resources in the Great Plains Region. Improved water management and conservation have been accomplished through several programs: Water Management Studies and Investigation of Existing Projects studies under the General Investigations Program. In addition, water conservation planning and technical assistance is being provided through the Water Management & Conservation and Reclamation Reform Act items under the Operations and Maintenance Programs. BOR manages 13 projects in Montana east of the Continental Divide. These include 11 dams and reservoirs, 9 diversion dams, 10 pumping plants and 2 power plants. The eastern Montana projects provide water to 352,915 acres of land which produced $78.5 million worth of crops in 1990. Principal crops are sugar beets, hay, corn, wheat and barley. Reclamation also operates three major dams and manages three projects in Western Montana that provides irrigation water to over 23,000 acres.

The BOR has many activities and programs that contribute to the stewardship of watersheds and water quality in Montana including:

Wetland Development Program (Great Plains Region): The Wetland Development Program provides assistance in the form of grants or cooperative agreements to public or private organizations such as Conservation Districts, tribes, and private conservation groups for improvement of wildlife habitat associated with water systems or supplies affected by BOR projects. Tom Parks (406) 247-7295, tparks@gp.usbr.gov

AgriMet: AgriMet is a satellite-linked, weather and evapotranspiration (ET) reporting network. This network is used to assist irrigators in scheduling irrigation applications. Growers use the system's data along with field examinations to determine when and how much water is required for optimum crop growth.

Hydromet Data System: Hydromet is a network of automated hydrologic and meteorologic monitoring stations located throughout the Great Plains Region. The Hydromet network collects remote field data and transmits it via satellite to provide real-time water management capability. Other available information is integrated with Hydromet data to provide streamflow forecasting and current runoff conditions for river and reservoir operations.

Coordination and collaboration opportunities include the following:

- Funding for watershed projects
- Technical assistance with irrigation issues
- Participation in TMDL development and water quality restoration planning in watersheds where BOR activities have a significant impact.

4.2.7 Environmental Protection Agency

Region 8 of the U.S. Environmental Protection Agency (EPA) includes the six states of Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming; and 27 Tribal Nations. The Region 8 Water Programs are responsible for implementing programs to protect the public and the environment by preventing, reducing and regulating contamination of surface water and ground water.

The EPA has many activities and programs that contribute to the stewardship of watersheds and water quality in Montana including the following:

Nonpoint Source Management Grant Program: Under Clean Water Act Section 319(h), EPA is authorized to dispense federal grant funds to delegated state NPS programs such as Montana's program to conduct NPS efforts in the state. Cooperative agreements are made between EPA and the state, enabling federal funds to be distributed. The state NPS program dispenses a portion of these funds to sponsors of NPS projects to support these efforts. The state must match the federal contributions of 60% with a 40% match for the total award. States make applications for funding annually. Approximately $3 million is available to Montana for 2001. More information can be obtained by contacting the DEQ Watershed Management Section 406-458-6771.

Wetland Protection Development Grants Program: Beginning in 1990 the EPA made grants available to Federally recognized tribes and state wetland agencies, state water quality agencies, and state agencies with wetland programs for development and/or enhancement of their wetlands protection programs. Grant funds can be used for both regulatory and non-regulatory wetland protection activities. EPA Wetlands Program State/Tribal Grant Funds can be used for a variety of wetland protection activities including: to incorporate wetlands into state water quality standards; to improve Section 401 water quality certification programs to protect wetlands; to develop state wetland regulatory programs; to assist with state Section 404 assumption efforts; to develop statewide wetland strategies; training leading to development of state wetlands protection programs; and wetland protection demonstration and restoration projects. Steve Potts, EPA Region 8, (406) 441-1140 x 232, potts.stephen@epa.gov.

Region 8 of EPA provides financial assistance for pollution control and pollution elimination projects through the **Regional Geographic Initiative Program**, the **Five-Star Restoration Program**, and the **Community-based Environmental Protection Program.** All three programs disburse funding allocated for implementation of sections 104(b)(3) and 106 of the Clean Water Act. Carol Campbell, Director of Ecosystem Protection Section, Region 8, (303) 312-6340.

Coordination and collaboration opportunities include the following:

- Provide financial assistance for watershed and water quality projects
- Provide technical assistance with water quality monitoring and modeling, source water and drinking water protection, and wetland management and protection activities

For additional information, contact: EPA Region 8 (406) 441-1140.

4.2.8 US Geological Service

The U.S. Geological Service (USGS) is the Nation's largest water, earth, and biological science and civilian mapping agency. The USGS works in cooperation with over 2,000 organizations across the country to provide reliable impartial scientific information to resource managers, planners, and other customers. This information is gathered in every State by USGS scientists to minimize the loss of life and property from natural disasters; contribute to the sound conservation, as well as the economic and physical development of the Nation's natural resources; and enhance the quality of life by monitoring water, biological, energy , and mineral resources. There are USGS offices in West Glacier, Kalispell, Missoula, Helena, Fort Peck, Billings, and Bozeman.

Through its Cooperative Research Program USGS is conducting several activities and programs that contribute to the stewardship of watershed health and water quality in Montana including the following:

The USGS is working closely with the US Forest Service and the Bureau of Land Management to develop efficient and cost-effective methods to evaluate effects and to formulate plans for remediation of abandoned mine lands. A pilot study was initiated in 1997 in the Boulder River watershed in southwestern Montana.

USGS scientists in partnership with Montana State University, Montana Fish, Wildlife, and Parks, and the USFWS are conducting studies of the effects of whirling disease on brown trout in the Ruby River and Poindexter Slough and on rainbow trout in the Missouri River, which is yielding important information to help resource managers maintain fish populations.

Through the National Water Quality Assessment program, USGS is conducting two studies encompassing portions of Montana: The Northern Rockies Intermontane Basins study and the Yellowstone River Basin study.

USGS works closely with residents, local groups, and agencies to provide data for specific needs and concerns such as characterizing surface and ground water resources to determine potential effects of urban development and mineral and energy resource development.

In cooperation with the Montana Department of Transportation, USGS is conducting a hydrogeologic assessment of wetland sites and potential wetland restoration/ mitigation sites.

Opportunities to collaborate and coordinate include the following:

- Technical assistance with ground-water issues including the determination of sources of nitrates, estimation of ground-water age, and flow-system modeling
- Technical assistance with surface-water issues including near real-time streamflow and water-temperature monitoring, flow statistics, and flood-plain delineation
- Technical assistance with water-quality issues including geochemical modeling and monitoring surface water and ground water for major ions, trace elements, pesticides, stable and radioactive isotopes, and sediment
- Cooperative funding of studies utilizing the technical expertise of the USGS

For additional information, contact Joanna Thamke (406) 457-5923.

4.2.9 US Army Corps of Engineers

The Department of the Army regulatory program initially served to protect and maintain the navigable capacity of the Nation's waters; however, Congress has expanded the US Army Corps' regulatory mission to include protection of the nation's aquatic environment. The US Army Corps of Engineers administers permit programs for Section 10 of the Rivers and Harbors Act and Section 404 of the Federal Clean Water Act. Section 10 permits are required for activities such as construction of structures (e.g., piers, wharfs, breakwaters, bulkheads, jetties, weirs, and transmission lines), dredging or disposal of dredged material, or excavation, filling, or other modifications to the navigable waters of the United States. Section 404 permits are required for activities involving the disposal of dredged or fill material into the waters of the United States.

The ACE supports watershed and water quality projects in Montana by facilitating the permitting process. For example, organizations and individuals proposing work in streams, wetlands, and other water bodies may fill out a single application form, which is accepted by the ACE along with several local and state agencies. In addition, the proposed Nationwide Permit #27 will facilitate permitting for stream restoration and wetland creation projects. Additional information about navigating the permitting process may be obtained by contacting a project manager at (406) 441-1375.

Table 4-1: Financial and Technical Assistance Programs and Agencies

Federal	Program Type and Agency		Nonpoint Source Categories					
	Financial	Technical	Agriculture	Forestry	Resource Extraction	Hydro-modification	Land Disposal	Construction
Farm Services Agency	FSA		■			■		
Natural Resource Conservation Service	NRCS	NRCS	■	■		■		
Env. Quality Incentives Program	NRCS	NRCS	■			■		
Grazing Lands Conservation Initiative	NRCS	NRCS	■					
Public Law 566	NRCS	NRCS	■					
Resource Conservation and Development	NRCS	NRCS	■	■		■		
Conservation Reserve Program	NRCS	NRCS	■	■		■		
Conservation Reserve Enhancement Program	NRCS	NRCS	■					
Emergency Watershed Protection Program	NRCS	NRCS	■			■		
Wetland Reserve Program	NRCS	NRCS	■					
Wildlife Habitat Incentive Program	NRCS	NRCS	■	■		■		
US Fish and Wildlife Service	FWS	FWS	■	■	■	■		■
Partners for Fish and Wildlife Program	FWS	FWS	■	■	■	■		■
Ecological Services Division		FWS	■	■	■	■		■
Bureau of Land Management	BLM	BLM	■	■	■	■		
Challenge Grants			■		■			
Abandoned Mine Lands	OSM, DEQ	DEQ			■			
Farmers Home Administration	FmHA		■	■		■		
Bureau of Reclamation	BR	BR	■			■		■
Environmental Protection Agency	EPA	EPA	■	■	■	■	■	■
Forest Service	FS	FS	■	■	■	■		

Table 4-1: Financial and Technical Assistance Programs and Agencies *(continued)*

State	Program Type and Agency		Nonpoint Source Categories					
	Financial	Technical	Agriculture	Forestry	Resource Extraction	Hydro-modification	Land Disposal	Construction
Department of Natural Resources and Conservation								
Renewable Resource Development Grants	DNRC	DNRC	■	■	■	■	■	■
Cons. Dist. US Grant	DNRC	DNRC	■	■	■	■	■	■
Rangeland Imprmt. Loan Pro.	DNRC	DNRC	■					
Reclamation and Development Grant Program	DNRC	DNRC	■					
Watershed Planning Assistance Grant	DNRC	DNRC	■	■				
Department of Environmental Quality	DEQ	DEQ	■	■	■	■	■	■
SRF Loans	DEQ	DEQ	■	■	■	■	■	■
Department of Agriculture		DOA	■	■				
Salinity Control Association	SCA	DEQ	■					
Conservation Districts	CDs	CDs	■	■	■	■	■	■
Fish Wildlife and Parks	FWP	FWP	■	■		■		
Future Fisheries	FWP	FWP	■	■		■		
Water Leasing Program	FWP	FWP	■	■		■		
SRF Loans	FWP	FWP	■	■		■		
Riparian Mgt./Water Quality	FWP	FWP	■	■		■		
Workshop Grant Program	FWP	FWP	■	■		■		

NRCS = Natural Resources Conservation Service
FWP = Fish Wildlife and Parks
DEQ = Department of Environmental Quality
FSA = Farm Services Agency
DNRC = Department of Natural Resources and Conservation
FWS = US Fish and Wildlife Service

CHAPTER 5

EFFICIENT ADMINISTRATION OF THE NPS PROGRAM

Efficient administration is an over-arching goal of the Montana NPS program. Substantial increases in NPS funding in 1999 and 2000 and limited numbers of staff positions for grant management have made this goal difficult to reach. DEQ has several new objectives which are designed to find new ways to help NPS project contractors and agency staff maintain accurate records and produce timely reports.

Montana has improved and updated its non-point source program resources by adding new staff, promoting good local projects, integrating NPS management objectives of other agencies with DEQ programs, and providing a strong focus on information and education. Along with these improvements, DEQ has developed administrative procedures to track project accomplishments, reports, products, and financial activities. This chapter highlights the new initiatives and ongoing activities. Appendix E is a list of Montana Nonpoint Source program projects.

5.1 EVALUATION AND REPORTING

5.1.1 Regional Coordinators

In an effort to improve NPS management and communication, DEQ has divided the state into four regions based on watershed boundaries. The regional coordinators track NPS projects and coordinate with other organizations and local groups on watershed management related initiatives including TMDLs. The regions are the Columbia basin, Upper Missouri basin, Lower Missouri (below Great Falls), and Yellowstone River basin. Having one person stay familiar with all of the various projects and attend local group meetings in a region is expected to promote better coordination by enhancing "networking" opportunities and developing closer personal interaction on projects.

5.1.2 Monitoring

Monitoring is an important element of the NPS program both at the project level and state level. Local projects are monitored to determine BMP effectiveness and overall project effectiveness. DEQ helps groups implement NPS projects by advising on the design of monitoring programs and by helping with the interpretation of monitoring data. The department is promoting sampling for biological and physical parameters as a better measure of aquatic and riparian health and project success. Annually the department reviews overall program effectiveness and reports to EPA. DEQ uses a project close-out process as one of the chief ways of doing this. Project sponsors of a finished project are interviewed and asked detailed questions on their working relationships with DEQ, how well bills were handled, contracts managed, and the quality of interactions they had with DEQ monitoring and planning specialists in accomplishing their project's objectives. DEQ also uses the contract start date as a measure of contracting efficiency. The closer to April 1 that DEQ finishes contracting, the better it did in terms of timeliness. The NPS

program's objective is to have contracts in place each year by the April 1, in time to collect water quality data prior to the start of the field season. July 1 is the deadline for budgeting state contractual funds without special legislative exceptions. Program effectiveness is also gauged by how well the sponsor met project milestones, the quality of the products, and the improvements in water quality. Finally, DEQ will evaluate program effectiveness each year in terms of how well it met short-term objectives in the NPS management plan. Each annual report will contain short term objectives for the coming year.

DEQ will continue to use STORET to share data with EPA and other agencies. NPS monitoring data validated by DEQ will be entered into a state data management system which will be compatible for transfer over to the STORET system.

Monitoring Work Group - In 1999 DEQ formed an advisory group on monitoring issues. The group was formed under the auspices of the Montana Watershed Coordination Council. The group has developed a work plan and will continue to meet routinely to discuss monitoring methods, to refine state strategies for monitoring, and identify methods to improve data analysis and management.

Quality Assurance (QA) Plan— The state developed a state NPS Quality Assurance plan in 1994 to help guide project contractors in ways to ensure that data of usable quality is collected and managed properly. The plan provides a good framework for local groups that used it for local QA planning. DEQ is reviewing its QA plan and will be revising it within the next two years.

Objective (July 2000) - Provide a new staff position in the Monitoring and Data Management Bureau who will be responsible for overall water monitoring Quality Assurance.

Objective (July 2001) - Prepare and complete public review and adoption of a new Water Quality Monitoring QA plan for the state that addresses NPS monitoring.

5.2 Fiscal Accounting System

DEQ follows standard and accepted accounting practices and strives to meet all state and federal laws and regulations regarding contract and fiscal management. The state has gone to an modern Oracle-based accounting system. The NPS program has also adopted the following tools to help it achieve efficiency and order in fiscal accounting.

PROJECT SPREADSHEETS - DEQ maintains a spreadsheets on all projects funded with 319 funds. These spreadsheets are updated with each payment and circulated by the administrative staff to regional NPS project managers. The sheets contain information on both local and federal match in addition to the payment record. These spreadsheets are filed along with each payment cover sheet and provide a record for reconciliation of accounts with project contractors.

ATTACHMENT B s - DEQ provides NPS project sponsors with a spreadsheet-billing form called an Attachment B. It is an attachment to the funding agreement or contract. The Excel or Lotus automated spreadsheet format helps reduce math errors by the contractors and keeps bills organized with cumulative totals organized by project task.

Fiscal Status Reports (FSRs)—FSRs are completed each year by DEQ Central

Objective – (By May 2001) provide Attachment B spreadsheet-billing forms to all NPS project contractors

Services Division. They provide an annual check on the total grant expenditures and match funds spent and assigned to each grant. These reports provide another check on the program's expenditure records, helping to ensure that funds are carefully accounted for.

Grant Reporting and Tracking System (GRTS)—The grant reporting and tracking system used by DEQ's NPS program is a key administrative tool for successful management and reporting.

The GRTS database was developed by EPA to provide states with a consistent way to report on the status of nonpoint source grants, including both staffing and support activities, as well as, local pollution control projects funded by those grants. The database is kept up to date by the Montana DEQ.

Objective (Every 6 months) - each May and November update NPS projects by task to GRTS mainframe.

Objective (Annual) - Each November update will include an annual check on total grant expenditures and match funds spent.

Long Term Objective (By October 2001) - Make GRTS updates available to all NPS project contractors via web-based database.

5.3 Program Coordination

5.3.1 Inter-agency Coordination

One of the primary reasons for using a watershed approach in this document is to provide a coordination tool for use by DEQ programs. By using watersheds, DEQ intends that this approach will foster greater understanding and involvement in water quality issues by other agencies in the state, in particular, local watershed groups and county governments.

Montana Watershed Coordination Council (MWCC)—DEQ intends to maintain an active role in this organization. The Council provides an excellent forum for a wide variety of water resource management groups to share information on water quality and other environmental issues. The Water Activities Work Group has provided DEQ with valuable technical support for the past 6 years in the review of local project grants for watershed restoration and groundwater protection as well as statewide educational projects. This review results in recommendations to DEQ each year for NPS funding. The Water Activities Work Group also provides recommendations to DEQ on it NPS management plan and was therefore involved in the review of drafts of this document. The NPS management plan will be reviewed by this Council, as well as DEQ program staff, every 5 years. DEQ will turn these recommendations into revisions as necessary and present the document to the public for review and comment. The Water Activities Work Group has also assisted DEQ by providing it and other state and federal agencies with options for conducting a biennial "unified watershed assessment" for supplemental Section 319 NPS funds. The extra funds, if they make it through the federal budget under the initiative called the Clean Water Action Plan, will be used in 2001 and 2002 for watershed

Long Term Objective (Every 2 years) – DEQ will work closely with MWCC to prepare and publicize a "unified watershed assessment" for targeting supplemental NPS grant funds

project implementation based on this assessment.

The Linking Work Group is also a part of the MWCC and has developed an excellent web page for the Council. This group has considerable expertise in the use of geographic and other data as a tool in watershed management. This group helped DEQ make improvements to Volume II of this plan. DEQ continues to participate in this work group and will seek recommendations of the committee on other information sharing issues as they develop.

Long Term Objective (Every 5 years) –MWCC will review Nonpoint Source Management Plan and make recommendations on revising it to meet changing needs

Federal Agency Coordination and Consistency Review DEQ and the federal agencies most involved in watershed management initiatives have operated for almost 14 years under various Memoranda of Understanding and similar coordination and technical assistance agreements. The closest coordination in the past has been with the USDA's Natural Resources Conservation Service, who has jointly funded inter-agency personnel agreements to house staff members at DEQ and in the nearby Lewis and Clark Conservation District.

These staffing agreements provide valuable communication, technology transfer, and coordination opportunities for all agencies involved. DEQ will continue to support the following agreements and work to develop new ones in 2001.

The MOUs (Memorandum of Understanding) with the NRCS, Forest Service, BLM, and MT Department of Transportation address how these agencies will help DEQ carry out its NPS pollution control duites. While MDT is a state agency, its use of federal funds can have potentially important NPS implications. The primary subjects of these memorandums are data sharing, addressing water quality limited streams, and reporting on proposed activities so that DEQ has adequate opportunity to provide a review and comments of activities that might cause NPS impacts to state waters.

NRCS Interagency Agreements for Technical Assistance: Since about 1994, DEQ has shared expenses for personnel in Helena to coordinate on water quality activities that affect private landowners and agricultural producers. These positions funded with 319 program grant funding provide high quality, responsive services to this land use community.

Objective (September 2001) DEQ will negotiate new interagency staffing agreements with NRCS.

USFS 1987 Memorandum of Agreement: The U. S. Forest Service has had an agreement in place since 1987. A new draft has been circulated to the USFS Region 1 office in Missoula. The Regional Hydrologist and NPS program manager at DEQ will negotiate revisions to this draft that achieve each agencies mutual interests in protection water quality relating to nonpoint sources. The existing 1987 MOU and draft are found in Appendix E. The department will also be developing a revised MOU with the U.S. Bureau of Land Management to reflect changes in state and federal management policies.

Objective (October 2001) Complete development and sign a new MOUs with the Forest Service and BLM regarding coordination on water quality planning.

Appendix A

MONTANA GROUND WATER PLAN

Water Resources Division
Department of Natural Resources and Conservation
48 North Last Chance Gulch
Helena, MT 59620-2301

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BACKGROUND

Montana Ground Water Plan was developed in response to concerns identified by citizens at public scoping meetings and as a result of a recommendation of the 1992 State Water Plan Section: Integrated Water Quality and Quantity Management. This section states: "The [DNRC] shall formulate and adopt and amend, extend, or add to a comprehensive, coordinated multiple-use water resources plan known as the 'state water plan'. The state water plan may be formulated and adopted in sections, these sections corresponding with hydrologic divisions of the state. The state water plan must set out a progressive program for the conservation, development, and utilization of the state's water resources and propose the most effective means by which these water resources may be applied for the benefit of the people, with due consideration of alternative uses and combinations of uses (MCA 85-1-203)." This effort also addresses a U.S. Environmental Protection Agency (EPA) recommendation for states to develop a comprehensive ground water protection program.

Initial work on the ground water plan began in 1992. A State Ground Water Planning Committee consisting of 22 ground water users, regulators, legislators, well drillers, and academicians identified a number of recommendations to assist citizens in preserving Montana's aquifers to sustain current and future beneficial uses. To guide plan formation, informational meetings were held around the state and a survey of almost 1,000 well owners, water interest groups, ground water discharge permit holders, and city and county governments was conducted. After a long hiatus resulting from personnel changes and the reorganization of state government, a newly formed Ground Water Work Group resumed work on the plan in 1998 by building on the information collected by the original planning committee. Comments on the plan were again solicited from members of the public, special interest groups and agency specialists through targeted mailings. To further gauge public sentiment regarding ground water issues, public meetings were held in major cities around the state. Finally, a series of collaborative editing sessions were held by the Ground Water Work Group to develop consensus language for the Plan's recommendations and implementation provisions.

The plan is divided into three subsections: Protection, Education and Remediation. Each of these subsections present a series of issues which have been identified through the plan development process. Under each issue is a set of recommendations designed to address each individual issue. Also under each issue is a set of "options considered", but not recommended. Most of these options were not included as recommendations because consensus was not reached regarding their inclusion.

CURRENT CONTEXT

Under the Montana Water Use Act, ground water is defined as "any water that is beneath the ground surface." The quality and availability of ground water in Montana vary greatly across the state. Aquifers in western Montana are typically found in unconsolidated intermontane, alluvial valley-fill materials that readily yield large quantities of high quality water to shallow wells. Also in the west, progressively more wells are being drilled into aquifers within bedrock, as development infringes on the edges of the intermontane valleys. Residents in eastern Montana commonly obtain ground water from aquifers occurring in unconsolidated, alluvial valley fill materials, glacial outwash and consolidated sedimentary formations. Eastern Montana aquifers typically yield less water than those of the west, and the water is more mineralized. The water in some eastern aquifers is suitable only for livestock consumption.

Approximately 217 million gallons each day (mgd) is withdrawn from aquifers underlying Montana. In 1990, ground water withdrawals were used for irrigation (90 mgd or 41.5 percent); public water supply and rural domestic use (66 mgd or 30.4 percent); industry (30 mgd or 13.8

percent); livestock (16 mgd or 7.4 percent); and mining (15 mgd or 6.9 percent) [USGS Circular 1081, 1993]. More than 50 percent of Montana's citizens rely on ground water for drinking and household use.

To secure a right to use ground water at a rate greater than 35 gallons per minute (gpm), or more than 10 acre-feet per year (afy), requires a permit from the Montana Department of Natural Resources (DNRC). More than one well or spring linked together also requires a permit if the combined withdrawals exceed 35 gpm or 10 afy. For a ground water use of less than these amounts, an appropriator simply should file a notice of completion with DNRC within 60 days of developing a well or spring. The applicant will then receive a water use certificate. These permits and certificates secure the appropriator's right to use ground water. The well driller is required to comply with construction standards adopted by the Board of Water Well Contractors and to submit a well log for each new well to the Department of Natural Resources and Conservation.

Across Montana, activities such as spills, improper waste disposal, and land use practices have caused ground water contamination. The Montana Water Quality Act (75-5-101 through 641, MCA) is designed to protect, maintain, and improve the quality of Montana's water resources. Contained within the Water Quality Act are provisions to prevent degradation of water quality and to protect beneficial uses of state water. Pursuant to the Water Quality Act, the Board of Environmental Review must establish classifications for all state waters and establish water quality standards to protect human health and the environment. A permit system is also administered under the Water Quality Act to control discharges of contaminants to surface water and ground water. In addition to the Water Quality Act, other statutes that include water quality protection provisions have been passed. These include laws to control mineral extraction and processing, hazardous and solid waste management, underground storage tank installation and monitoring, pesticide and fertilizer management, and municipal and domestic sewage disposal. Any of these activities may threaten the quality of ground water.

Unanticipated spills and releases may cause contamination of ground water at almost any location in Montana, particularly along transportation routes. Abandoned or inactive sites where ground water is contaminated or where wastes have been improperly disposed of are being discovered in many locations. More attention is being focused on ground water pollution from mining and industry, sewage and improper animal waste management, and certain farming practices which cause saline seeps.

The recommendations made under the plan are stated as who "should" do what. There was much discussion and some disagreement over this term among the group that developed this plan. Some members continue to prefer the stronger term "shall." The term "should" was used because the plan provides overall direction for ground water programs that have been widely agreed to. It also recognized that some of the recommendations will require additional resources to implement, and that unless the additional resources are available, they will not get done. Furthermore, funding mechanisms are determined by the Legislature and priorities may be set by that process.

POLICY STATEMENT

It is the policy and practice of Montana to protect and improve the quality and quantity of its ground water resources. The Montana Ground Water Plan sets forth recommendations for improving public and private management of the State's ground water with a goal of sustaining current and future uses.

ISSUES, OPTIONS, AND RECOMMENDATIONS

Subsection A: Ground Water Protection Strategy

Goal: To protect and improve the quality and quantity of Montana's ground water resources in order to sustain current and future uses and to protect public health.

Purpose: To provide government, businesses, and individuals with the best possible information and guidance for making decisions that protect and improve Montana's ground water.

Over 50 percent of all Montana citizens, which includes 95 percent of rural residents, depend on ground water for their domestic water supply. In most cases Montanans enjoy a wholesome and plentiful supply of ground water. Yet where ground water has been contaminated, the public has become increasingly aware that the cost of clean-up generally exceeds the financial ability of most communities and state government. Therefore, along with enforcing the law, citizens need new ways to prevent ground water contamination and to protect this vital resource.

Since 1986, the state has made considerable progress in establishing programs to protect ground water. **Appendix A** is a current listing of ground water protection-related programs within the state. This section of the Montana Ground Water Plan contains recommendations aimed at coordinating implementation of these programs and determining where there are gaps or duplication of services.

Issue 1--Ground Water Resources and Uses: *Inventory, classify, and monitor ground water to determine existing conditions.*

Because available data indicate that a number of Montana's surface water basins are over appropriated, the Montana Legislature closed several of them to future appropriations. These river basins include the Upper Missouri, Jefferson, Madison, Teton, Upper Clark Fork, Beaverhead and Red Rock. As a result of these surface water closures, and surface water shortages elsewhere, more people are turning to ground water to satisfy their water needs. The State should ensure that these ground water appropriations do not adversely affect surface water flows or uses. Baseline information on the status of ground water resources is needed to protect ground water quality, to sustain ground water supplies, to make better ground water management decisions, and to define the role surface water interaction plays in ground water quality and availability. Montana does not yet have comprehensive information on the quality and quantity of its ground water. The options recommended below will add to the efforts to address this need.

Options Recommended

1. The Department of Natural Resources, Montana Bureau of Mines and Geology, the Board of Water Well Contractors, and the Montana Water Well Drillers Association should work together to determine the data required on a well log and then ensure these data are collected and reported accurately and completely.

2. The Department of Environmental Quality, the Department of Natural Resources and Conservation, the Board of Water Well Contractors, the Board of Oil and Gas Conservation, and the Montana Department of Agriculture should encourage all persons collecting and submitting water samples for regulatory purposes, to provide minimum well construction and locational data. Each sample should be clearly marked with the township; range; and section; latitude and longitude of the well; altitude of the well, and the method by which it was determined; the county name; the date and time taken; the depth of the well; the depth of the screened or open interval; and the static water level. In addition, to the extent possible, persons should be encouraged to collect EPA's minimum set of data elements for ground water quality. This information is necessary to build a consistent and better water resource data base.

3. Watershed groups, with assistance from Conservation Districts, Local Water Quality Districts the Montana Bureau of Mines and Geology, the Department of Environmental Quality, and the Department of Natural Resources and Conservation, should be encouraged to: 1) participate in local ground water planning; 2) perform a comprehensive evaluation of existing ground water uses; 3) plan for future ground water uses; and 4) estimate the quantities of ground water available to meet existing and future needs.

4. The Legislature should evaluate whether existing funding is adequate for the Montana Bureau of Mines and Geology to fulfill the requirements of the Ground Water Assessment Act. Any restructuring of Resource Indemnity Trust funding mechanisms should include Ground Water Assessment Act implementation as a high priority.

5. When considering ground water grant applications, the Department of Natural Resources and Conservation (under the Renewable Resource Development Grant Program) should give priority to those applications that either protect public health, ground water and ground water recharge, or define the role of irrigation, septic systems, constructed wetlands, and sewage lagoons in ground water recharge and discharge, particularly where there is a potential connection to surface waters.

6. When considering ground water grant applications, the Department of Environmental Quality (under the Clean Water Act Section 319 Nonpoint Source Grant Program) should give priority to those applications that either protect public health, ground water and ground water recharge, or define the role of irrigation, septic systems, and constructed wetlands in ground water recharge and discharge, particularly where there is a potential connection to surface waters.

7. Where appropriate, regional assessments conducted under the Montana Bureau of Mines and Geology's Ground Water Assessment Program should consider the interrelationship between surface and ground water.

8. County planning agencies should consider identifying areas prone to subdivision development where ground water supplies may be present because of irrigation recharge. Alternative water sources should be considered to address potential supply deficits in these areas.

Other Options Considered

1. Establish standard methods for production testing new wells in Montana's aquifers.

2. Coordinate the establishment of ground water classifications on tribal lands with tribal governments so that these classifications are compatible with those on non-tribal lands in accordance with ARM 17.30.1002.

(See summary of Issue 1 below)

Issue 2--Sources of Pollution: *Identify those activities and substances, including naturally occurring substances, that pollute ground water in Montana.*

To help identify and track ground water contaminants, site information collected by federal, state, and local agencies should be available and linked through Natural Resource Information System for ready access and comparison. In addition, those activities that affect the flow or chemical characteristics of ground water should be determined. Similarly, the biological components of ground water need better definition.

Saline ground and surface water are gradually developing over the Northern Great Plains as a result of annual cropping systems and less dependence on perennial forage. The salts are naturally present in the ground water from the native bedrock and overlying soil. Land use management redistributes the saltload, bringing it closer to the surface and/or into solution in the locally derived water table.

Options Recommended

1. State and local agencies, and those parts of the Montana University System that manage ground water data, should ensure that their data are available to the public and that their data bases are compatible, and that Geographic Information System (GIS) coverages derived from these sources can be readily incorporated into a state-wide GIS clearinghouse such as that managed by the Natural Resource Information System.

2. The Department of Environmental Quality and Local Water Quality Districts should encourage the inventory and monitoring of potential contaminant sources in communities that use ground water for drinking water.

3. The Department of Environmental Quality and Local Water Quality Districts should evaluate the long-term effect on ground water from documented ground water pollution, including mining, agriculture, business, industry and development, sewage, and waste management.

4. When considering ground water grant applications, the Department of Natural Resources and Conservation (under the Renewable Resources Development Grant Program) should give priority to grant applications that assess how bacteria and viruses are introduced and transported through aquifer materials and that determine the fate and transport of industrial and agricultural chemicals in ground water, particularly where there is a potential connection to surface water.

5. When considering ground water grant applications, the Department of Environmental Quality (under the Clean Water Act Section 319 Nonpoint Source Grant Program) should give priority to grant applications that assess how bacteria and viruses are introduced and transported through aquifer materials and that determine the fate and transport of agricultural chemicals in ground water, particularly where there is a potential connection to surface water.

Other Options Considered

1. Create a Montana Pollution Prevention computer network which: 1) compiles information on contaminants, Best Management Practices, and alternative methods of preventing ground water pollution, and 2) facilitates exchange of information between agencies and individuals working in the field.

(See summary of Issue 2 below)

Issue 3--Management and Protection: *Help Montanans protect the State's ground water.*

Improved management practices are needed to protect the state's ground water from contamination. Knowingly or unknowingly, Montanans open ground water to potential degradation through many activities in their daily lives. This may occur directly through routine sewage disposal practices or accidental leaks and spills, or more indirectly by use or handling of toxic or potentially contaminating materials on the land surface. Industrial sites, animal confinement facilities, and even certain agricultural activities may expose ground water to potential contaminants. Pathways for contaminant flow to ground water may be opened through exploratory well drilling, water well construction, and seismic exploration activities. Existing land use practices and the conversion of agricultural land to residential land, coupled with inappropriate domestic drinking water well locations, are significantly affecting ground water in some areas of Montana. Improved water management through land use changes in both dryland and irrigated agriculture are needed to decrease saline conditions.

Individuals, watershed groups, and other water users should be encouraged to define and protect local ground water resources. Citizen participation in the state's ground water permitting process is one means to accomplish this. Strategies need to be developed to strengthen the ability of local and state agencies to effectively and proactively implement ground water protection programs.

Creation of Local Water Quality Districts is one way to accomplish this. Government should provide technical support and information to the public to prepare them to address ground water issues. There is a need for better coordination and systematic evaluation of the many ground water protection programs dispersed among various federal, state and local agencies. Consistent enforcement and administration of statutes intended to protect ground water is necessary for the public to have confidence in existing regulatory programs.

Options Recommended

1. Grants funded from the Resource Development Grant Program should be allocated so that priority is given to projects that: 1) locate and properly seal abandoned water wells and bore holes, and 2) control existing uncontrolled flowing artesian wells.

2. State agencies with ground water programs should regularly evaluate the adequacy and effectiveness of their ground water protection programs and submit the results of these evaluations to the Environmental Quality Council. Beginning in 2001, the Environmental Quality Council should review these evaluations and publish a summary report every four years that:

a. contains the results of the agencies' ground water protection program evaluations including enforcement actions;

b. describes the status of Montana's ground water resources in relation to ongoing or recurring problems such as well contamination;

c. reports on implementation of the Montana Ground Water Plan.

d. makes recommendations to improve or modify the Montana Ground Water Plan.

3. The Department of Environmental Quality, the Department of Agriculture, and the Department of Natural Resources and Conservation should ensure compliance with applicable ground water quality standards.

4. Watershed groups, with support from Conservation Districts, the Montana Bureau of Mines and Geology, the Department of Environmental Quality, and the Department of Natural Resources and Conservation, should be encouraged to manage and protect ground water problems at the local level.

5. The Ground Water Work Group of the Montana Watershed Coordination Council should encourage cooperation and communication between state agencies, Local Water Quality Districts, the Montana Salinity Control Association, county agricultural extension agents, and local watershed planning groups in addressing ground water issues at the local level.

6. The Department of Environmental Quality, the Department of Natural Resources and Conservation, and the Montana Department of Agriculture should develop and disseminate information on Best Management Practices and Water Quality Protection Practices, including waste minimization, to users of and dischargers to ground water, through county governments, county libraries and water-related Internet websites.

7. The Department of Environmental Quality should continue to encourage and support local collection centers to assure proper disposal of automotive and household hazardous wastes.

8. The Legislature should reauthorize and continue to fund the Regional Pesticide Waste Collection Program administered by the Department of Agriculture.

9. The Department of Environmental Quality should encourage waste minimization programs for all permit applicants when there is a potential for ground water impacts.

10. The Departments of Natural Resources and Conservation and Environmental Quality should encourage the Natural Resource Conservation Service to provide funding to locate and properly seal abandoned water wells and boreholes. The Natural Resources and Conservation Service, within program limitations and available funding, will provide technical advice and financial assistance to conservation district cooperators who request help on decommissioning wells.

Other Options Considered

1. The Department of Natural Resources and Conservation should evaluate the use of professional arbitrators, mediators, and staff of the Montana Consensus Council to address ground water disputes.

2. The Department of Environmental Quality should identify and address those management practices that contribute to ground water contamination.

3. The Department of Environmental Quality should evaluate water conservation practices to assure they will not cause water quality problems.

4. Encourage creative solutions to issues and costs related to installing water and sewage collection systems to improve ground water contamination areas that now use septic systems and wells.

(See summary of Issue 3 below)

Subsection B: Ground Water Education Strategy

Goal: To engage Montanans of all ages in action (personally or publicly) that supports the wise use, management and protection of ground water.

Purpose: To develop and support effective ground water education strategies and programs that include information, training, and action.

Education is critical for protecting ground water. Ground water protection requires pollution prevention. This can only be accomplished by people who are aware of the effects their actions have on ground water. Informational materials, education, technical assistance, and training on basic ground water laws, characteristics, and processes are essential prerequisites to successful ground water policy implementation. This subsection of the Montana Ground Water Plan identifies educational assistance and information necessary to effectively implement all components of this plan.

Issue 4--Public Awareness: *Expand public awareness of ground water.*

Many Montanans may not be aware that more than 50 percent of Montana's domestic water comes from ground water sources, and that individual actions can pollute those sources. There is a real need to expand public awareness of issues related to ground water. Activities that were once considered harmless are now known to threaten ground water (for example, septic systems, agricultural runoff, and using waste oil for dust suppression). Citizens should know that ground water is a valuable resource; that it can be overused or permanently contaminated; that the costs of pollution clean-up can be prohibitive, and in some cases, infeasible; and that pollution prevention is easier than clean-up.

Several ground water education programs have the goal of elevating public awareness and understanding of ground water. For example, Project WET (Water Education for Teachers), Local

Water Quality Districts, and the Montana Watercourse's "Know Your Watershed" workshops all provide community education opportunities that include general ground water information.

Options Recommended

1. State and local agencies with ground water protection programs should coordinate with each other, and with educational groups, to develop and deliver educational programs to ensure that every Montanan is aware of the importance of ground water. For example, coordination may be enhanced through groups such as the Montana Watershed Coordination Council.

2. The Montana University System, including the Extension Service, the Water Resources Center, the Montana Watercourse, and the Environmental Studies Program should collaborate on conducting statewide survey(s) to determine ground water education needs and to assess public understanding and knowledge of actions being taken to protect ground water in Montana.

3. The Department of Natural Resources and Conservation, the Department of Environmental Quality, the Montana University System, and others should seek funding in collaboration with local ground water protection programs, such as the Local Water Quality and Conservation Districts, to inform citizens of the benefits and responsibilities of personal and community actions to protect ground water.

Other Options Considered

1. Identify and stratify target audiences, based on age, demographics, occupation, education, geographic location (for example, curricula for teachers, Extension faculty, cattle feedlots, irrigators, industry, etc.)

2. Develop appropriate awareness tools (for example, limited focus and limited content.)

3. Identify and utilize the appropriate place, delivery mechanism, and price investment by audience, time, effort, and promotional angle.

(See summary of Issue 4 below)

Issue 5--Understanding and Making Knowledge: *Increase public knowledge of ground water characteristics and processes, and prepare citizens to take positive action to protect and enhance Montana's ground water.*

A basic knowledge and understanding of ground water is necessary to make informed personal and public choices about ground water use and management, and to avoid land use practices that can adversely impact aquifers. Ground water education and information resources should target audiences (for example, agricultural interests, private well-owners and septic system owners) to prepare citizens to protect ground water and to manage their systems responsibly. Ground water seminars should be conducted for city and county decision makers to equip local leaders with the knowledge they need to institute appropriate protection strategies. Citizens who understand the economic, ecological, and health costs of contaminated ground water, who know that clean-up of ground water can be prohibitively expensive, and who see the connection between conservative uses of ground water and a sustained supply, are citizens prepared for responsible management of ground water resources.

A number of ground water education programs in Montana, currently work to improve public understanding and knowledge of ground water attributes and processes. **Appendix B** identifies existing ground water education programs in Montana. The ongoing work of the Montana Bureau of Mines and Geology's Ground Water Assessment Program contributes valuable information,

data, and interpretations that can only strengthen these educational programs. Additionally, the State Library has available through the Natural Resource Information System, a Montana Ground Water Atlas showing the state's major aquifer systems (in hard-copy and electronic forms). It is critical that these efforts receive financial support to ensure their effectiveness in realizing the following recommendations.

Options Recommended

1. Ground water education programs should be a priority. Local, state and federal entities should support and assist in obtaining funds to provide education programs that include the following attributes:

a. Inform Montanans how aquifer characteristics affect ground water's sensitivity to various types of pollutants;

b. Develop, refine, and deliver local, regional, and state programs to ensure that Montanans understand ground water and aquifer definitions, attributes, uses, quality and quantity issues, relationships to surface water, and protection measures;

c. Inform Montanans about the economic, ecological, and health consequences of ground water pollution. This involves describing the benefits of preventing ground water pollution versus the costs of ground water clean-up, and providing models of successful ground water protection strategies;

d. Inform Montanans about activities that can pollute ground water, and ways that contaminants reach ground water (for example, agricultural, industrial, mining and municipal sources, and abandoned wells, bore holes, sumps, improperly constructed wells, injection wells, etc.)

e. Inform Montanans about water conservation practices and new technologies to protect ground water.

f. Inform Montanans about the history and problems associated with uncontrolled flowing artesian wells in Montana, and the need to address this problem.

g. Inform Montanans about the importance of proper water well location and construction.

Other Options Considered

1. Develop and deliver a planned, coordinated, multi-part educational program to elevate the knowledge-level of targeted audiences directly involved with ground water.

2. Focus educational efforts on actions that can be taken by individuals, groups, or organizations to protect and reclaim ground water.

(See summary of Issue 5 below)

Issue 6--Technical Assistance, Training, and Action: *Enhance Montanans' abilities to take action to prevent contamination and to clean-up contaminated ground water.*

Montanans will benefit from ready access to technical assistance and training that will enhance their skills and abilities to use current technology to prevent pollution and clean-up contaminated ground water. A variety of programs exist in Montana which provide training and technical assistance for targeted audiences (see **Appendix B** for listing). Water and wastewater operators, specifically, have access to technical training and assistance through several programs. The

Montana Rural Water Systems offers information for city governments about wellhead protection, and provides classes on wellhead protection and well construction for interested citizens, local officials, water and wastewater operators, and others. The Department of Environmental Quality's Source Water Protection and Wellhead Protection Programs offer a voluntary program emphasizing local assessment, education, and training for professionals working with drinking water systems to protect public water supplies. Existing programs should be funded and actively coordinated to assure their continued effectiveness.

Options Recommended

1. The Board of Water Well Contractors, in cooperation with the Department of Natural Resources and Conservation and the Montana Bureau of Mines and Geology, should coordinate additional training on how to accurately report well locations on well logs. Also, the Board of Water Well Contractors, Montana Bureau of Mines and Geology, and Department of Natural Resources and Conservation should provide additional training for drillers to enhance the accurate description of geologic materials on well logs and in reports.

2. The Board of Water Well Contractors should continue to provide enhanced training for water well drillers and consultants on proper well construction methods and techniques to control flowing artesian wells.

3. The Montana Watershed Coordination Council should continue its water information and education work group and, together with its ground water work group, help coordinate ground water education programs.

4. Ground water education programs in Montana should provide educators with technical support and training to facilitate student involvement in community action projects which protect, sustain, or clean-up Montana's ground water.

5. Ground water education programs in Montana should inform citizens and industry how they can initiate and lead efforts to protect and manage ground water and participate in ground water clean-up, with assistance from educational institutions, and local, state and federal agencies.

6. Ground water education programs in Montana should provide continuing education to businesses, individuals, local governments and agencies to encourage the use of appropriate technology to enhance, protect, and clean-up Montana's ground water.

7. Educational institutions, together with local, state and federal agencies, should be responsible for continuing and increasing ground water education through local ground water workshops and contacts with individual water users.

8. Government agencies should provide public access to sources of information on ground water laws, regulations, technologies, clean-up standards, economic incentives, and available assistance.

Other Options Considered

1. Provide research opportunities to support businesses, individuals, and agencies who are directly involved with the use of appropriate technology to enhance and protect Montana's ground water.

2. Identify ground water education centers of excellence and recommend educational entities or agencies to provide informational resources to businesses that show how water quality improvements can help the "bottom-line" and enhance value.

(See summary of Issue 6 below)

Subsection C: Ground Water Remediation Strategy

Goal: To eliminate or reduce harmful impacts to human health and the environment posed by ground water contamination.

Purpose: To coordinate regulatory activities to effectively address clean-up of ground water contamination.

Legislation passed in the last ten years established or enhanced a variety of regulatory programs for solid waste landfills, underground fuel storage tanks, mines, agricultural chemicals, and other sources of pollution. Due to pollution liability concerns, property assessments to document the degree of contamination that may be present at a site are standard for commercial property sales. As a result of increased regulatory requirements, as well as heightened public awareness about pollution, numerous sites with ground water contamination have been discovered in Montana. This section of the Montana Ground Water Plan is intended to ensure that responsible and appropriate action is taken at those sites.

Issue 7 ---Adminstration and Standards: *Ensure compliance with Montana and federal environmental regulations and standards to accomplish site clean-up consistently and thoroughly.*

Administrative procedures and clean-up standards differ under Montana's various environmental laws. Actions that responsible parties are required to undertake in the event of a pollutant release should be dependent upon the severity of the threat to human health and the environment. Currently, clean-up actions are dictated by which regulatory program has jurisdiction over the pollutant release. For example, a spill of an herbicide could result in multiple violations of environmental regulations including, but not limited to: the Montana Water Quality Act, Montana Pesticides Act, Montana Agricultural Chemical Ground Water Protection Act, Resource Conservation and Recovery Act, Comprehensive Environmental Cleanup and Responsibility Act, and Metal Mine Reclamation Act. Although these laws serve to protect human health and the environment, they must be implemented effectively and more consistently.

Options Recommended

1. The Montana Departments of Environmental Quality, Agriculture, Natural Resources and Conservation, and the Board of Oil and Gas should establish an Interagency Remediation Committee (Committee) composed of representatives of relevant programs. The Committee would establish regular meeting schedules to review newly reported cross-jurisdictional contamination sites to ensure a timely and consistent response. The Committee should concentrate its efforts on complex sites with the greatest risk to public health and the environment, and on solving generic recurring clean-up concerns. The Committee would be organized and led by the Department of Environmental Quality's Remediation Division.

2. The Montana Departments of Environmental Quality, Agriculture, Natural Resources and Conservation, and the Board of Oil and Gas should establish policies to develop and consistently apply water quality and soil standards for clean-up of contaminated sites and use of standards applied to historic contamination. The policies may allow for site specific flexibility based on risk, current and future use, toxicity, exposure, costs/benefits, and public input.

3. The Montana Departments of Environmental Quality, Agriculture, Natural Resources and Conservation, and the Board of Oil and Gas should inform government, business, and individuals about the requirement to meet water quality standards, and the consequences for not meeting those standards.

4. The Department of Environmental Quality should establish policies and procedures to consistently and quickly handle permits and/or waivers to permits for urgent situations where short-term discharges will occur for clean-up purposes only.

5. The Department of Environmental Quality should develop rules to require reporting of spills and release of contaminants at unpermitted sites. The rules should clearly identify when, how, and to whom spills are to be reported and set guidelines for minimum quantities that must be reported. The Department should also write rules to require reporting of historic contamination when it is discovered. The rules should clearly identify when, how, and to whom discoveries of historic contamination are to be reported.

6. The Department of Environmental Quality should investigate and inventory ground water nonpoint source pollution and determine the need for clean-up, as time and resources allow.

7. State and local agencies should encourage inventories of potential contaminant sources in communities that use ground water for drinking water. The Department of Environmental Quality should assist public water supplies in delineating areas that contribute to water supplies and assess potential threats through the Source Water Protection Programs.

8. The Environmental Quality Council, in collaboration with the Department of Environmental Quality's Remediation Division, and the Department of Commerce, should undertake a study to determine the need for and utility of tax and other types of financial incentives to encourage voluntary clean-up and redevelopment of contaminated sites within Montana. The incentive should be structured in a way to be sure that only persons with no prior connection to the property and who did not contribute to the contamination receive the incentive.

9. The Department of Environmental Quality, and local agencies responsible for the permitting of septic systems, should ensure, to the extent possible, that unintended cumulative effects of septic systems will not exceed nondegradation standards.

10. The Board of Environmental Review should adopt standards and regulations that will prevent pathogen contamination of ground water and protect public health.

Other Options Considered

1. Standardize clean-up levels among remediation programs.

2. The Legislature should amend the Metal Mine Reclamation Act to require a reclamation bond for all mining and milling operations including small mining and milling operations excluded from permitting and bonding requirements, for example, recreational miners.

3. The Legislature should amend the Metal Mine Reclamation Act to require a financial assurance test for mine permit applicants showing their ability to implement water remediation measures.

4. The Legislature should amend the Water Quality Act to remove the cap on the Water Quality Rehabilitation Act so that all penalties collected accumulate in the account to fund clean-up and program activities.

(See summary of Issue 7 below)

Issue 8 ---Inventory and Characterize Contaminated Sites: *Develop a system to identify, catalog, and characterize contaminated sites in order to focus the state's resources.*

Montana does not have a comprehensive inventory system to track the location or to evaluate the status of contaminated sites. An inventory system would benefit potential property buyers or existing property owners by making it easier, through contact with one system, to determine if any state agencies have identified existing or potential pollution at a particular site. The state cannot ensure compliance and oversee clean-up at all sites, therefore, a comprehensive inventory would assist agencies in determining the severity of pollution at specific locations relative to other sites for prioritization purposes.

Options Recommended

1. The Natural Resource Information System should maintain and improve the statewide clearinghouse that links the location of contaminated sites regulated by the Departments of Environmental Quality, Agriculture,Natural Resources and Conservation, the Board of Oil and Gas, and Local Water Quality Districts. Each agency should contribute consistent information to create and maintain the network.

2. The Departments of Environmental Quality, Agriculture, Natural Resources and Conservation, and the Board of Oil and Gas should regularly share information on contaminated sites and clean-up activities at those sites through the Interagency Remediation Committee. The agencies should initially describe how each program sets priorities and determines the type of information and frequency of reporting needed. At a minimum, the agency reports should include a listing of any new sites discovered and plans for remediation. For those identified as significant to the Committee, the reports should also include: (1) the status of ground water contamination; (2) an evaluation of the effectiveness of clean-up activities; and (3) data necessary to assess the potential for the spread of contamination.

Other Options Considered

1. Prioritize contaminated ground water areas for remediation based on use, toxicity, exposure, costs/benefits, and cumulative effects.

(See summary of Issue 8 below)

Issue 9---Research and Technology: *Support waste recycling and new pollution clean-up and containment methods.*

Montana's citizens and remediation programs would benefit from new research and methods for ground water clean-up. Research and the development and implementation of new technologies are necessary steps to solving pollution problems that exist today and preventing pollution in the future. Developing new technologies and new solutions requires some risk that must be balanced with the potential benefits of the new technologies.

Options Recommended

1. The Montana University System, in collaboration with the Department of Environmental Quality, should encourage the evaluation and implementation of innovative technologies for cleaning up ground water contamination. This could include, but not be limited to, independent data collection, testing under Montana conditions, repeatable experimental results by independent researchers, peer review, performance monitoring, and contingency provisions in the case of failure of the innovation.

2. The Department of Environmental Quality and the Department of Natural Resources and Conservation should explore and develop options for supporting innovative advancements in

technology and cost-effective protection of ground water quality and quantity at the state and local levels.

Other Options Considered

1. It is the policy of the State of Montana to encourage the development and use of innovative technologies for cleaning up water contamination.

2. Promote recycling and reusing wastes recovered from ground water clean-up sites where appropriate.

3. Support research on new clean-up technologies including those designed to assist natural purifying processes and plume management.

4. Evaluate pollution clean-up and containment methods to assure cross-media contamination will not occur.

5. Establish a link between research and clean-up needs.

(See summary of Issue 9 below)

GROUND WATER PLAN IMPLEMENTATION

Issue 1 - Ground Water Resources and Uses

Rec. No.	Action	Implementing Entity(ies)	Timeframe
1.1	(1) Determine data required on a well log; (2) Ensure well data are collected and reported accurately.	DNRC, MBMG, BWWC, and MWWDA.	(1) A new well log form has been developed and issued. (2) Ongoing effort.
1.2	(1) Encourage collection of minimum well construction and locational data; (2) encourage collection of EPA's minimum data elements for ground water quality.	DEQ, DNRC, BWWC, BOGC, and MDA.	Initiate immediately and continue effort.

1.3	(1) participate in local ground water planning; (2) evaluate existing ground water uses; (3) plan for future uses; (4) estimate the quantities of ground water available to meet existing and future demand.	Watershed groups, CD's, Local Water Quality Districts, MBMG, DEQ, and DNRC.	Initiate immediately and continue effort.
1.4	(1) Evaluate whether existing funding is adequate to fulfill the requirements of the Ground Water Assessment Act.	The Legislature and MBMG.	RIT restructuring proposal submitted to the 1999 Legislature would guarentee a constant funding level for the GWA program.
1.5	Give priority to grant applications that: (1) protect public health, ground water and recharge, or (2) define the role of irrigation, septic systems, constructed wetlands, and sewage lagoons in ground water recharge and discharge.	DNRC Resource Development Grant Program.	Effective immediately.
1.6	Give priority to grant applications that: (1) protect public health, ground water and	DEQ Nonpoint Source Grant Program.	Initiate immediately and continue effort.

	define the role of irrigation, septic systems, and constructed wetlands in ground water recharge and discharge.		
1.7	Regional assessments should consider the interrelationship between ground and surface water.	MBMG Ground Water Assessment Program.	Initiate immediately and continue effort.
1.8	Identify areas prone to subdivision where ground water may be present because of irrigation recharge.	County planning agencies.	Initiate immediately and continue effort.

Issue 2--Sources of Pollution

Rec. No.	Action	Implementing Entity(ies)	Timeframe
2.1	Ensure that ground water data are compatible, and that GIS coverages derived from these sources can be readily incorporated in to a state-wide GIS clearinghouse.	State and local agencies, and those parts of the Montana University System that manage ground water data.	Initiate immediately and continue effort.
2.2	Encourage the inventory and monitoring of potential contaminant sources in communities that use ground water for drinking.	DEQ and Local Water Quality Districts.	Effective immediately.
2.3	Evaluate the long-term effect on ground water from pollution including mining, agriculture, business, industry and development, sewage, and waste management.	DEQ and Local Water Quality Districts.	ASAP - As time and resources permit.

2.4	Give priority to grant applications that: (1) assess how bacteria and viruses are introduced and transported through aquifers; and (2) determine the fate and transport of industrial and agricultural chemicals in ground water.	DNRC Resource Development Grant Program.	Effective immediately.
2.5	Give priority to grant applications that: (1) assess how bacteria and viruses are introduced and transported through aquifers; and (2) determine the fate and transport of industrial and agricultural chemicals in ground water.	DEQ Section 319 Nonpoint Source Grant Program.	Effective immediatly.

Issue 3 - Management and Protection

Rec. No.	Action	Implementing Entity(ies)	Timeframe
3.1	Give priority to projects that: (1) locate and properly seal abandoned bore holes and water wells; and (2) control existing uncontrolled flowing artesian wells..	DNRC Resource Development Grant Program.	Effective immediatly.
3.2	Evaluate the adequacy and effectiveness of ground water protection programs. EQC publish a report every four years that: (a) contains the results of the evaluations, including enforcement; (b) describes the status of Montana's ground water resources; (c) reports on implementation of the Ground Water Plan; (d) makes recommendations to improve or modify the Ground Water Plan.	State agencies with ground water programs and EQC.	2003 Legislature and every other legislative session thereafter.
3.3	Ensure compliance with applicable ground water quality standards.	DEQ, MDA, DNRC.	Ongoing effort.
3.4	Encourage ground water management and protection at the local level.	Watershed groups, with support from CD's, MBMG, DEQ, and DNRC.	Initiate immediately and continue effort.
3.5	Encourage cooperation and	Ground Water Work	Initiate immediately

	communication between state agencies, Local Water Quality Districts, county agricultural extension agents, and local watershed planning groups in addressing ground water issues at the local level.	Group of the Montana Watershed Coordination Council.	and continue effort.
3.6	Develop and disseminate information on Best Management Practices and Water Quality Protection Practices to users of and dischargers to ground water, through county governments, county libraries, and the Internet.	DEQ, DNRC, MDA.	Initiate immediately and continue effort.
3.7	Encourage and support local collection centers to assure proper disposal of automotive and household hazardous waste.	DEQ.	Ongoing effort.
3.8	Reauthorize and continue to fund the Regional Waste Pesticide Collection Program.	The Legislature.	Legislative proposal submitted to the 1999 session by MDA.
3.9	Encourage waste minimization programs for all permit applicants where there is a potential for ground water contamination.	DEQ.	Ongoing effort.
3.10	Encourage NRCS to provide funding to locate and properly seal abandoned water wells and boreholes.	DNRC and DEQ.	Ongoing effort.

Issue 4 - Expand Public Awareness

Rec. No.	Action	Implementing Entity(ies)	Timeframe
4.1	Coordinate the development and delivery of educational programs on ground water.	State and local agencies with ground water protection programs.	Ongoing effort.
4.2	Collaborate on conducting a statewide survey(s) to determine ground water education needs and to assess public understanding and knowledge of actions being	The Montana University System: Extension Service, Water Resources Center, Montana Watercourse, and	Effective immediately.

	taken to protect ground water.	Environmental Studies Program.	
4.3	Seek funding in collaboration with local ground water protection programs to inform citizens of the benefits and responsibilities of personal and community actions to protect ground water.	DNRC, DEQ, MUS, MT Watercourse, and others.	Initiate immediately and continue effort.

Issue 5 - Understanding and Making Knowledgable Decisions

Rec. No.	Action	Implementing Entity(ies)	Timeframe
5.1	Support and assist in obtaining funds to provide ground water education programs that: (a) informs how aquifer characteristics affect ground water's sensitivity to pollution; (b) ensures that Montanans understand ground water, and ground water issues; (c) informs about the economic, ecological and health consequences of ground water pollution; (d) informs about activities that can pollute ground water; (e) informs about water conservation and new technologies; (f) informs about the history and problems of flowing artestian wells; and (g) informs about proper well location and construction.	All local, state and federal entities and the Montana Watershed Coordination Council	Initiate immediately and continue effort.

Issue 6 - Technical Assistance, Training, and Action

Rec. No.	Action	Implementing Entity(ies)	Timeframe
6.1	Coordinate additional training on how to accurately report well locations on well logs and enhance the accurate description of geologic materials on well logs and in reports.	BWWC in cooperation with DNRC and MBMG	Ongoing effort.

6.2	Continue to provide enhanced training for water well drillers and consultants on proper well contruction methods and techniques to control flowing artesian wells.	BWWC	Ongoing effort.
6.3	Continue water information and education work group and, together with the ground water work group, help coordinate ground water education programs.	MWCC	Ongoing effort.
6.4	Provide educators with technical support and training to facilitate student involvement in community action projects.	Ground water education programs in Montana.	Initiate immediately and continue effort.
6.5	Inform citizens and industry how they can initiate and lead efforts to protect and manage ground water.	Ground water education programs in Montana with assistance from educational institutions, and local, state and federal agencies. (see Appendix B)	Initiate immediately and continue effort.
6.6	Provide continuing education to businesses, individuals, local governments, and agencies to encourage the use of appropriate technology to enhance, protect, and clean-up Montana's ground water.	Ground water education programs in Montana. (see Appendix B)	Ongoing effort.
6.7	Continue and increase ground water education through local ground water workshops and contacts with individual water users.	Educational institutions, together with local, state and federal agencies.	Ongoing effort.
6.8	Provide public access to sources of information on ground water laws, regulations, technologies, clean-up standards, economic incentives, and available assistance.	Government agencies.	Ongoing effort.

Issue 7 - Administration and Standards

Rec. No.	Action	Implementing Entity(ies)	Timeframe

7.1	Establish an Interagency Remediation Committee	DEQ, MDA, DNRC and BOG	Initiate immediately and continue effort.
7.2	Establish policies to develop and consistently apply water quality and soil standards for clean-up of contaminated sites and use of standards applied to historic contamination.	DEQ, MDA, DNRC and BOG	Initiate immediately and continue effort.
7.3	Inform government, business, and individuals about the requirement to meet water quality standards, and the consequences for not meeting those standards.	DEQ, DNRC, MDA, and BOG	Ongoing effort.
7.4	Establish policies and procedures to consistently and quickly handle permits and or waivers to permits for urgent situations where short-term discharges will occur for clean-up purposes only.	DEQ	Initiate and continue effort.
7.5	Develop rules to require reporting of spills and release of contaminants at unpermitted sites and require reporting historic contamination when it is discovered.	DEQ	Initiate and continue effort.
7.6	Investigate and inventory ground water nonpoint source pollution and determine the need for clean-up, as time and resources allow.	DEQ	Continue effort.
7.7	(1) Encourage inventories of potential containant sources in communities that use ground water for drinking water. (2) Assist public water supplies in delineating areas that contribute to water supplies and assess potential threats through the Source Water Protection Programs.	(1) State and local agencies (2) DEQ	Continue effort.
7.8	Undertake a study to determine the need for and utility of tax and other types of financial incentives to encourage voluntary clean-up and redevelopment of contaminated sites within Montana.	EQC, in collaboration with DEQ Remediation Division, and MDC	Study resolution submitted to the 1999 Legislature.
7.9	Ensure, to the extent possible, that unintended cumulative effects of septic systems will not exceed nondegradation standards.	DEQ and local agencies responsible for the permitting of septic systems.	Ongoing effort.
7.10	Adopt standards and regulations	BER	Effective Immediately

	that will prevent pathogen contamination of ground water and protect public health.		

Issue 8 - Inventory and Charaterize Contaminated Sites

Rec. No.	Action	Implementing Entity(ies)	Timeframe
8.1	(1) Maintain and improve the statewide clearinghouse that links the location of contaminated sites regulated by DEQ, DNRC, MDA, BOG, and Local Water Quality Districts. (2) Contribute consistent information to create and maintain the network.	(1) NRIS (2) DEQ, MDA, DNRC, BOG, and Local Water Quality Districts	Ongoing effort.
8.2	Regularly share information on contaminated sites and clean-up activities at those sites through the Interagency Remediation Committee.	DEQ, MDA, DNRC, and BOG	Initiate immediately and continue effort.

Issue 9 - Research and Technology

Rec. No.	Action	Implementing Entity(ies)	Timeframe
9.1	Encourage the evaluation and implementation of innovative technologies for cleaning up ground water contamination.	MUS, in collaboration with DEQ	Ongoing effort.
9.2	Explore and develop options for supporting innovative advancements in technology and cost-effective protection of ground water quality and quantity and the state and local levels.	DEQ and DNRC	Ongoing effort.

Appendix A

MONTANA GROUND WATER PROTECTION RELATED PROGRAMS, ACTIVITIES, LEGISLATION, AND IMPLEMENTING AGENCIES

Programs or Activities or,Title of Legislation	What it Does	Legislation	Responsible State Agencies
Abandoned Mine Reclamation	Uses federal funds to cleanup abandoned mines operated prior to the 1970's	Title 82, Chapter 4 MCA	DEQ Remediation DivisionMine Waste Cleanup Bureau
Agricultural Chemical Ground Water Protection Act	Requires response to pesticide contamination in ground water. MOU describes what activities MDA/DEQ are responsible for implementing.	Title 80, Chapter 15, Part 1 MCA	DEQ Remediation Division, Permitting and Compliance Division, Planning, Prevention and Assistance Division;MDA Agricultural Sciences Division
Ambient ground water monitoring system (see Ground Water Assessment Act)			
Aquifer vulnerability assessment (see Ground Water Assessment Act)			
Aquifer mapping (see Ground Water Assessment Act)			
Aquifer characterization (see Ground Water Assessment Act)			
Board of Water Well Contractors A.K.A. Well driller rules	Establishes rules for well drillers	ARM 36, Chapter 21	DNRC Water Resources Division, Water Operations Bureau
Cesspool, Septic Tank and Privy Cleaners Act	Regulates the pumping and disposal of certain wastes	Title 37, Chapter 41, Part 1 MCA	DEQ Permitting and Compliance Div. Community Services Bur.
Comprehensive Environmental Cleanup & Responsibility Act	Requires liable parties to cleanup hazardous substances	Title 75, Chapter 10, Part 7 MCA	DEQ Remediation Div Hazardous Waste Site Cleanup Bur. & Mine Waste Cleanup Bureau

(CECRA) A.K.A. Montana Superfund			
Comprehensive Environmental Response, Compensation, & Liability Act (CERCLA) A.K.A. Federal Superfund	Requires liable parties to cleanup hazardous substances. State participates through cooperative agreement with EPA.	Title 75, Chapter 10 Part 6 MCA	DEQ Remediation Div Hazardous Waste Site Cleanup Bur. & Mine Waste Cleanup Bureau
Drinking Water Revolving Loan Fund	Establishes revolving loan program for PWSs	Title 75, Chapter 6, Part 2 MCA	DEQ Planning Prevention, and Assistance Div., Technical and Financial Assistance Bur, and DNRC
Environmental Policy Act	Establishes state policy protecting right to use property and to promote efforts to prevent environmental damage	Title 75, Chapter 1, Part 1 MCA	DEQ Planning, Prevention, and Assistance Div., Resource Protection Planning Bur.; DNRC and others
Generic Pesticide state management plan (see Agricultural Chemical Ground Water Protection Act)			
Ground water appropriations (see Water Rights)			
Ground water controlled area(see also Water rights)	Establishes surface area boundaries of area from which ground water withdrawal is regulated. Can be based on ground water quantity or quality.	Title 85, Chapter 2 MCA	DNRC, Water Resources Division
Ground water discharge permits (see Ground Water Pollution Control System)			
Ground water best management practices (see Agricultural Chemical Ground Water Protection Act and Water Quality Protection Practices)			
Ground water use legislation (see Water Rights)			
Ground water standards &			

classifications (see Ground Water Pollution Control System)			
Ground Water Assessment Act	Establishes comprehensive program to assess and monitor state ground water resources	Title 85, Chapter 2, Part 9 MCA	Montana Bureau of Mines and Geology at Montana Tech of UM
Ground Water Plan (see State Water Plan			
Ground Water Pollution Control System (MGWPCS)	Establishes ground water standards and permit requirements for discharges into ground waters. Also states emergency powers of DEQ/what RPS must do in the event of a spill.	ARM 17, Chapter 30, Sub-chapter 10	DEQ Permitting and Compliance Division, Water Protection BureauRemediation Division, Site Response Section
Hazardous Waste Management Act	Regulates hazardous material management	Title 75, Chapter 10, Part 4 MCA	DEQ Permitting & Compliance Division
Interagency coordination for ground water protection initiatives	Establishes agreement between resource management agencies to ensure cooperation	formalized by Memorandum of Understanding (MOU)	DNRC, DEQ, MDA
Local Water Quality Districts	Authorizes/describes establishment of LWQDs	Title 7, Chapter 13, Part 45 MCA	DEQ Planning, Prevention, and Assistance Div, Pollution Prevention Bur., and local government
Major Facility Siting Act	Establishes policy to ensure power generation or conversion facilities do not produce adverse environmental impacts	Title 75, Chapter 20, Part 1 MCA	DEQ Planning, Prevention, and Assistance Div., Resource Protection Planning Bur.
Metal Mine Reclamation Act (see Mine Reclamation)			
Mine Reclamation	Establishes siting and reclamation requirements for coal, metal, and aggregate mining	Title 82, Chapter 4 MCA	DEQ Permitting & Compliance Division
Montana Pollutant Discharge Elimination System (MPDES)	Establishes discharge permit requirements, pollutant limits, and treatment standards for discharges into surface waters	ARM 17, Chapter 30, sub-chapters 12-14	DEQ Permitting and Compliance Div., Water Protection Bur.
Nondegradation policy and criteria for determining nonsignificance	Prohibits degradation of high quality state waters	ARM 17, Chapter 30, sub-chapter 7	DEQ Planning, Prevention, and Assistance Div., Resource Protection Planning Bur.
Oil and gas exploration and	Establishes permit system for exploration	Title 82, Chapter 1 MCA	DNRC Oil and Gas Conservation Div.

development permits			
Open Cut Mining Act (see Mine Reclamation)			
Petroleum Storage Tank Cleanup	Establishes procedures for investigation and remediation at petroleum releases	Title 75, Chapter 11, Part 3 MCA	DEQ Remediation Div., Hazardous Waste Site Cleanup Bur.
Petroleum Tank Release Cleanup Fund	Authorizes funding mechanism to cleanup leak sites	Title 75,Chapter 11Part 3	Petroleum Tank Release Compensation Board (administratively attached to DEQ)
Pollution prevention program	Provides pollution prevention technical assistance and information		Montana State University Extension Service P2 Program
Public water supply and sewer system program	Establishes minimum standards for construction and operation of public systems	Title 75, Chapter 6 MCA	DEQ Permitting and Compliance Div., Community Services Bur.
Reclamation and Development Grant Program	Provides funding for reclamation of mined areas, identification and repair of hazardous waste sites, and research	Title 90, Chapter 2 MCA	DNRC Conservation and Resource Development Division
Renewable Resource Development Grant	Provides funding to protect, conserve, or develop renewable resources including water.	Title 85, Chapter 1 MCA	DNRC Conservation and Resource Development Division
Resource Conservation and Recovery Act (RCRA)	Montana has primacy for implementation of the Act that regulates hazardous materials	42 U.S. C. § 6901 et seq.	DEQ Permitting & Compliance Division
Resource Indemnity Trust	Source of funds for clean up of contaminated sites		DNRC
Safe Drinking Water Act	Directs EPA to establish drinking water standards and monitoring program, UIC program, SRF program, and provides for enforcement of same. Directs states to develop source water protection program and operator certification program	40 U.S.C. § 141 P.L. 104-182	DEQ Permitting and Compliance Div., Community Services Bur., and Planning, Prevention and Assistance Div., Pollution Prevention Bur.
Salinity control	Inventories saline sites and provides technical assistance, works closely with USDA NRCS and local CDs		Montana Salinity Control Association; and DNRC
Sanitation in Subdivisions Act	Establishes policy to control water supply and sewage disposal at subdivisions	Title 76, Chapter 4, Part 1 MCA	DEQ Permitting and Compliance Division, Water Protection Bur.
SARA Title III Program (see	This is the Superfund Amendments and		

Comprehensive Environmental cleanup & Responsibility Act)	Reauthorization Act		
Septic System Standards	Establishes policy to require county board of health regulations establish minimum standards for on-site sewage treatment systems	Title 50, Chapter 2, Part 1 MCA	DEQ Permitting and Compliance Div., Community Services Bur.
Small Business Assistance Program	Provides pollution prevention technical assistance and market development	Federal Clean Air Act 42 U.S.C § 507	DEQ Planning, Prevention and Assistance Div, Pollution Prevention Bureau
Solid Waste Management Act	Establishes authority to regulate solid waste management systems; sets goals for waste reduction in Montana	Title 75, Chapter 10, Part 2 MCA	DEQ Permitting and Compliance Division, Community Services Bur.
Source Water (Wellhead) Protection Program	Authorizes implementation of Montana Wellhead Protection Program	Title 75, Chapter 6 MCA	DEQ Planning, Prevention, and Assistance Div., Pollution Prevention Bur.
Source Water Assessment Program	Establishes procedures to delineate and assess the source of water used by PWSs		DEQ Planning, Prevention, and Assist Div., Pollution Prevention Bur.
State Superfund-CECRA (see Comprehensive Environmental Cleanup & Responsibility Act)			
State Water Plan	Directs DNRC to prepare continuing comprehensive inventory of water resources and develop management plan	Title 85, Chapter 1, Part 2 MCA	DNRC Water Resources Div.
Storm Water Discharge Permit (see Montana Pollutant Discharge Elimination System)			
Strip and Underground Mine Siting Act (see Mine Reclamation)			
Subdivision and Platting Act	Establishes policy to require minimum standards for plats, and to ensure subdivisions are in the public interest	Title 76, Chapter 3, Part 1 MCA	local government

Federal Superfund-CERCLA (see Comprehensive Environmental Response, Compensation & Liability Act)			
Underground Storage Tank Act	Establishes minimum standards for tank installation, operation, and maintenance	Title 75, Chapter 11, Part 5 MCA	DEQ Remediation Div., Technical Services Bur.
Underground injection control program	State has primacy to regulate waste injection associated with oil/gas production A.K.A. Class II Injection Wells. All other classes are regulated by U.S. EPA	Federal Safe Drinking Water Act, Part C	DNRC Oil and Gas Conservation Div., & Montana office of U.S. EPA
Waste Water Revolving Loan Fund	Establishes revolving loan program for waste water systems	Title 75, Chapter 5, Part 11 MCA	DEQ Planning, Prevention and Assistance Div., Technical and Financial Assistance Bur. and DNRC
Water Rights	Establishes policy and authority to manage water rights through permit system and adjudication process and system to reserve water for future use	Title 85, Chapter 2 MCA	DNRC Water Resources Div.
Water and Wastewater Operators Certification	Establishes program to ensure certification and continuing education of operators of public systems	Title 37, Chapter 42 MCA	DEQ Permitting and Compliance Div., Operator Certification Program
Water Quality Act	Establishes authority to protect, maintain, and improve water quality	Title 75, Chapter 5 MCA	DEQ Enforcement Division & Remediation Division
Water Quality Protection Practices	Describes activities or procedures that protect water quality	Title 75, Chapter 2, Part 1 MCA	DEQ Planning, Prevention, and Assistance Div., Resource Protection Planning Bur.
Water Well Standards	Establishes construction standards for water wells	Title 37, Chapter 43 MCA	DNRC Water Resources Div., Water Operations Bur.

APPENDIX B

GROUND WATER EDUCATION PROGRAMS IN MONTANA

WATER EDUCATION PROGRAMS IN MONTANA

A. Drinking Water Treatment Program **(MSU Extension Service)**

An education program dealing with residential treatment of drinking water. The program focuses on methods of treatment as well as treating many common water problems found in Montana private water systems. (Contact: Mike Vogel 994-3451)

B. Farm*A*Syst (MSU Extension Service)

The Montana Farmstead Assessment System (Farm*A*Syst) is designed to enable farmers and other rural residents to use a voluntary, systematic approach to assess the site of their drinking water well and increase awareness of ground water contamination hazards. It teaches well owners to identify and rank the specific risks that may threaten their drinking water, and encourages and facilitates the development of an individual action plan to reduce pollution risks. (Contact: Scott Lorbeer, 994-6070)

C. Local Water Quality District Programs

Local Water Quality Districts are defined areas established to protect, maintain and improve the quality of state ground and surface water for human health and the environment. Water Quality District programs may include the development of public awareness and education campaigns, wellhead protection of public water supplies, identification and monitoring of known sources of ground water contamination, etc. Water Quality Districts have been established in Helena, Bozeman, and Missoula. The Lewis and Clark Water Quality Protection District (Helena) has developed "Water Watchers," a water quality protection program for fourth graders, which includes a field trip and a one-hour classroom presentation.

D. Know Your Watershed Workshops (Montana Watercourse, MSU)

The Montana Watercourse works with community-based groups to develop custom-designed watershed education workshops on the general theme of "Know Your Watershed." Using a collaborative planning process, local water users and community members develop a workshop content agenda specific to the watershed. Topics covered generally include the characteristics,and management of surface and ground water, and related land resources in the watershed. The workshop goals are: (1) to increase participants' knowledge and understanding of their watershed; (2) to share the facts about water/land use, water quality, surface/groundwater supplies, and the way these are interrelated; (3) to provide an opportunity for public dialogue among all stake holders and community members regarding the many demands and uses of the watershed; (4) to provide information and resources on other watershed planning and management initiatives being used in Montana and the West; and (5) facilitate communication and collaboration among water resource "experts" and communities needing their expertise. (Contact: Mary Ellen Wolfe 994-1910)

E. Midwest Assistance Program, Inc.

Midwest Assistance Program (MAP) is a non-profit, technical assistance organization dedicated to helping small, rural communities and other entities find affordable and acceptable solutions to their water, wastewater and solid waste problems. MAP provides on-site technical, development and management assistance to communities. Other entities, such as reservations, mobile home parks, water and sewer districts, and other areas are also beneficiaries of MAP's assistance. (Contact: Judy Sass 273-0410 or Lee Michalsky 494-1858)

F. Montana Ground Water Assessment Program (MT Bureau of Mines & Geology)

F1. Monitoring Program: The result of the Montana Groundwater Assessment Act, the monitoring program builds-on and expands existing ground-water monitoring in the state. At completion, the monitoring program will establish at least 730 monitoring points in various parts of the state. The wells will be measured quarterly for the long term. Approximately 10 percent of the network will have water-level recorders installed for periods of time of up to three years and the recorders will be rotated periodically to other wells. Ten percent of the wells will be sampled each year to assess long-term changes in water quality. Data are placed in the Ground-Water Information Center and will be available in various GIS coverages. (Contact: Ground Water Information Center, Montana Bureau of Mines and Geology, 1300 West Park Street, Butte, Montana 59601. 496-4167)

F2. Ground Water Characterization Program: The Montana Ground-Water Characterization Program will map the distribution and document the water quality and physical properties of the state's aquifers. The Montana Ground Water Assessment Act of 1992 established the characterization program whose purpose is to provide information to help the public and private sectors make decisions on how to manage, protect, and develop Montana's ground water resources.

F3. Ground Water Information Center: Water-well log, water quality, static-water level and other information related to ground water is housed at the Information Center and are available to decision-makers and other interested people upon request. Data generated by the Ground-Water Assessment Act, other programs at the Bureau of Mines, and other agencies are also placed in the Information Center. (Contact: Ground-Water Information Center, Montana Bureau of Mines and Geology, 1300 West Park Street, Butte, Montana 59601 496-4167)

G. Montana Environmental Training Center (METC) Programs

A variety of technical training opportunities are provided by METC which either directly or indirectly affect ground water. Annually, these include Fall Water School at MSU, Spring Water School in Miles City, Cross-Connection Training, Safe Drinking Water Act New Sampling and Monitoring, an Advanced Wastewater Workshop on activated sludge concepts, and Ground Water Protection. METC's goal is to develop and implement effective training and provide technical guidance for water and wastewater operators, water well contractors, and other environmental and public health professionals. (Contact: Jan Boyle, METC Coordinator 454-2728)

H. Montana Materials Exchange Program

MSU Extension Service and the Montana Chamber of Commerce. A program to help individuals, groups and organizations exchange waste materials, recyclables and other products. One program goal is to reduce waste deposited at landfills (and thereby decrease possibilities of ground water contamination). Includes a bulletin board service. (Contact: Reeves Petroff, 994-

3518)

I. Montana Salinity Control Association (MSCA)

A satellite program through the conservation district, MSCA provides ground water investigation for saline soil and water reclamation. MSCA works on a voluntary basis with individuals and small watershed projects, with a portion of the technical assistance fee-based. In addition to the reclamation plans, MSCA provides BMP education programs to agricultural producers, natural resources staff and other land-use management groups. The state program is based in Conrad. (Contact: Jane Holtzer 278-3071)

J. Private Pesticide Applicator Certification Training (MSU Extension Service)

All private pesticide applicators must participate in a one-day training every five years in order to maintain their certification. MSU Extension regularly provides the Water Quality section of this training, and this includes information relating to the protection of ground water quality. (Contact: Greg Johnson, 994-3861)

K. Pollution Prevention Program (MSU Extension Service)

Non-regulatory, confidential education and technical assistance for Montana's small businesses on air, water, and solid & hazardous waste pollution prevention. Publications, workshops and individual technical assistance help businesses profit by decreasing waste disposal and treatment costs, regulatory oversight and long-term liability and increasing business efficiency and worker safety. Current business focus types include: automotive, dry cleaning, autobody, printing and hotel/motel. In conjunction with the Montana Chamber of Commerce, operates the Montana Materials Exchange for businesses networking to "turn potential waste into savings."

(Contact: Mike Vogel 994-3451)

L. Project WET Montana (Montana Watercourse)

Project WET Montana, the youth and teacher-training program of the Montana Watercourse,is disseminating ground water information, training, and materials at all Project WET workshops. The training consists of hands-on participation and practice with numerous ground water teaching activities for K-12 teachers from the Project WET Activity Guide. In addition, most Project WET workshops also have training and practice with the Project WET Montana Ground Water Flow Model Education Trunk. Seven Ground Water Flow Model Education Trunks are available for use by teachers and resource personnel across Montana. Other ground water materials disseminated by Project WET Montana include numerous pamphlets, informational brochures, posters, and videos supplied by various local, state and federal agencies. Over 40 workshops reaching more that 1000 Montana educators are conducted each year. (Contact: John Etgen, Project WET Montana Coordinator at 994-6671)

M. Solid Waste Institute of Montana (SWIM)

Several Solid Waste Programs relate to and/or address ground water in Montana. These include Training for Landfill Operators and Local Officials; a Household Hazardous Waste Consumer Education Program; a Municipal & Backyard Composting Education Program; a Precycle Community Education Program; and a Solid Waste Education for Youth program. SWIMNET provides computer access and teleconferencing regarding pollution prevention and includes training, registration, information resources, regulatory issues, special wastes, landfill operations, and source reduction. (Contact: Mike Vogel 994-3451)

N. Water/Wastewater School

A week-long school held several times per year around the state for water and waste water treatment plant operators and managers and co-sponsored by the Montana Department of Environmental Quality, the Montana Environmental Training Center, and the Montana University System Water Center at MSU. (Bill Bahr, 444-5337 or Eric Minneti, 444-4769)

O. Wellhead Protection Program (Montana Rural Water Systems)

Offers information for city governments about well-head protection, also provides classes for interested citizens, local officials, water and wastewater operators and others on wellhead protection and well construction. (Contact: Montana Rural Water Systems 454-1151)

P. Wellhead Protection Program (Planning, Prevention and Assistance Division, DEQ)

A voluntary program designed to protect ground water used for public water supply in Montana from contaminants which may have an adverse effect on human health. Emphasizes local control, education and training for professionals working with drinking water systems. Includes a school-based program for protecting water supply systems located on public school grounds. (Contact: Joe Meek 444-4086)

Q. Montana Water Information System

(MIS) is a component of the Natural Resource Information System (NRIS) in the Montana State Library. MIS is a water data clearing house and referral service linking users with the best source of information. The System provides access to all types of water information including data on ground water, surface water, water quality, precipitation, snow pack, and water rights. MIS staff provide training and technical assistance on how to access sources of ground-water information, and on the use of computer software for reformatting the information to make it more usable. (Contact: Duane Anderson 444-5356)

R. Montana Ground Water Atlas

Using data supplied by the Bureau of Mines & Geology, an atlas is available showing the state's major aquifer systems. A hard copy publication will also be maintained electronically, and will be available over INTERNET and in electronic format for schools. Data layers in the Atlas can be included in educational programs and packages and distributed to counties that rely on ground water.

S. Bureau of Land Management

The Bureau of Land Management (BLM) is a cooperator in the Montana Ground Water Assessment Program and is represented on the advisory and technical committees. BLM funds monitoring of ground water quantity and quality effects from coal mining, studies on ground water availability and aquifer impacts from flowing wells. BLM also conducts ground water education for schools and at fairs utilizing a ground water demonstration trunk.

T. County Conservation Districts

Conservation Districts provide for the conservation and wise use of soil and water resources, including ground water. Districts address resource management needs locally through educational activities and projects; including workshops, classroom programs, resource tours, demonstration projects, public forums, resource assessments, and conservation projects. Districts acquire technical and financial assistance from state, federal and private sources to address local natural resource management issues. There are 58 Conservation Districts in Montana. (Contact: County Conservation District or the Montana Association of Conservation Districts 443-5711)

U. Reader's Service - Water Information Program (Montana University System Water Center)

The explosion of literature regarding water issues and information has made it extremely difficult for the water professional and/or user to keep up with current information. The purpose of this on-going Reader's Service (a component of our information transfer mission) is to provide a lending library by mail of "grey" literature relative to water resources on a bi-monthly basis. The Center is currently in the midst of a needs assessment survey to determine if this service should be streamlined to provide information only on specific topic areas. Our mailing list has been revamped to include all major government offices within Montana (both state and federal), university-system campus staff, organizations and individuals with an interest in water issues. If you have any publication and/or information that may be of interest to others please let us know and we'll be glad to distribute it. (Contact: Kathy Stephens 994-6690)

V. Commercial and Governmental Pesticide Applicator Recertification Training (Montana Department of Agriculture)

All commercial and governmental pesticide applicators must participate in training courses to obtain 12 credit hours of educational information in a four year period or take a re-examination to maintain an applicator license. Training courses includes information on protecting ground and surface water quality from pesticide contamination. (Contact: Kim Johnson, 444-5400)

Appendix B

Montana's Agricultural BMPs for Control of Nonpoint Source Pollution

Based on Montana Conservation Practice Standards from NRCS Technical Guide

Practice	Practice Code	Current Standard
Access Road (FT)	560	4/87
Alley Cropping	311	1/00
Animal Trails and Walkways (FT)	575	8/63
Bedding (AC)	310	7/89
Brush Management (AC)	314	2/85&7/94
Channel Vegetation (AC)	322	1/00
Chiseling and Subsoiling (AC)	324	5/89
Clearing and Snagging (FT)	326	4/87
Commercial Fishponds (AC	397	6/72
Conservation Cover (AC)	327	9/97
Conservation Crop Rotation (AC)	328	12/98
Contour Buffer Strips	332	3/99
Contour Farming (AC)	330	5/89
Contour Orchard and Other Fruit (AC)	331	7/89
Cover and Green Manure Crop (AC)	340	3/83
Critical Area Planting (AC)	342	3/76
Cross Wind Stripcropping (AC)	589-B	2/88
Dam,Diversion (NO)	348	10/95
Dam,Floodwater Retarding (NOandAC-FT)	402	4/79
Dam,Multiple-purpose (NOandAC-FT)	349	4/79
Dike (FT)	356	4/87
Diversion (FT)	362	4/79
Early Successional Habitat Development/Management	647	3/00
Fence (FT)	382	10/89
Field Border (FT)	386	4/00
Filter Strip (AC)	393-A	4/98
Firebreak (FT)	394	7/98
Fish Racewaysor Tank (M,FT,andM3/S,FT3/S)	398	5/74
Fish Stream Improvement (FT)	395	10/95
Fishpond Management (NO)	399	6/72
Floodwater Diversion (FT)	400	4/79
Floodway (FT)	404	4/79
Forage Harvest Management (AC)	511	5/99
Forest Harvest Trails and Landings (AC)	655	8/98
Forest Site Preparation (AC)	490	11/71
Forest Stand Improvement (AC)	666	3/72
Grade Stabilization Structure (NO)	410	4/87
Grassed Waterway (AC)	412	2/80
Grazing and,Mechanical Treatment (AC)	548	6/77
Heavy Use Area Protection (AC)	561	7/89
Herbaceous Wind Barriers	422-A	10/98
Hillside Ditch (FT)	423	7/89
Irrigation Canal or Lateral (FT)	320	4/79
Irrigation Field Ditch (FT)	388	4/79
Irrigation Land Leveling (AC)	464	4/87
Irrigation Pitor Regulating Reservoir, Irrigation PiT (NO)	552-A	4/79
Irrigation Pitor Regulating Reservoir,Regulating Reservoir (NO)	552-B	4/79
Irrigation Storage Reservoir (NOandAC-FT)	436	4/79

Irrigation System,Sprinkler (NOandAC)	442	4/87
Irrigation System,Surface and Subsurface (NOandAC)	443	7/89
Irrigation System,Tailwater Recovery (NO)	447	7/89
Irrigation System,Trickle (NOandAC)	441	4/87
Irrigation Water Conveyance,Ditchand Canal Lining, Non-Reinforced Concrete (FT)	428-A	7/87
Irrigation Water Conveyance,Ditch and Canal Lining, Flexible Membrane (FT)	428-B	4/87
Irrigation Water Conveyance,Ditch and Canal Lining, Galvanized Steel (FT)	428-C	4/79
Irrigation Water Conveyance,Pipeline,Aluminum Tubing (FT)	430-AA	7/89
Irrigation Water Conveyance,Pipeline, Asbestos-Cement Pipeline (FT)	430-BB	7/87
Irrigation Water Conveyance,Pipeline,Non-Reinforced Concrete (FT)	430-CC	7/87
Irrigation Water Conveyance,Pipeline,High-Pressure, Underground Plastic (FT)	430-DD	7/87
Irrigation Water Conveyance,Pipeline,High-Pressure, Underground Plastic for 20-to36-inch diameter pipe with SDR>=51 (FT)	430-DD-A	4/87
Irrigation Water Conveyance,Pipeline,Low-Pressure, Underground Plastic (FT)	430-EE	7/87
Irrigation Water Conveyance,PipelineLow-Pressure, Underground,Plastic for 20-inch diameter pipe (100-fthead and50psipipeand21-inchdiameter SDR64 pipe) (FT)	430-EE-A	7/87
Irrigation Water Conveyance,Pipeline,Steel (FT)	430-FF	7/89
Irrigation Water Conveyance,Pipeline,Reinforced Plastic Mortar (FT)	430-GG	7/87
Irrigation Water Conveyance,Pipeline,Rigid Gated Pipeline (FT)	430-HH	1/87
Irrigation Water Management (AC)	449	4/79
Land Clearing (AC)	460	7/89
Land Reclamation,Fire Control (NO)	451	7/89
Land Reclamation,Highwall Treatment (NOandM,FT)	456	7/89
Land Reclamation,Landslide Treatment (NOandHA,AC)	453	7/89
Land Reclamation,Subsidence Treatment(HA,AC)	454	7/89
Land Reclamation,Toxic Discharge Control (NO)	455	7/89
Land Reconstruction,Abandoned Mine Land (HA,AC)	543	7/89
Land Reconstruction,Currently Mined Land (HA,AC)	544	7/89
Land Smoothing (AC)	466	4/87
Lined Waterwayor Outlet (FT)	468	7/89
Mole Drain (FT)	482	4/87
Mulching (AC)	484	2/93
Nutrient Management (AC)	590	4/00
Obstruction Removal (AC)	500	4/87
Open Channel (FT)	582	4/87
Pasture and Hayland Planting (AC)	512	3/99
Pest Management (AC)	595	1/91
Pipeline (FT)	516	10/92
Pond (NO)	378	3/88
Pond Sealing or Lining, Flexible Membrane Lining (NO	521-A	4/87
Pond Sealing or Lining,Soil Dispersant (NO)	521-B	7/89
Pond Sealing or Lining, Bentonite Sealant (NO)	521-C	7/89

Pond Sealing or Lining, Cationic Emulsion-Waterbourne Sealant (NO)	521-D	7/89
Pond Sealing or Lining,Asphalt-Sealed Fabric Liner (NO)	521-E	7/89
Precision Land Forming (AC)	462	4/87
Prescribed Burning (AC)	338	4/99
Prescribed Grazing (AC)	528-A	2/96
Pumped Well Drain (NO)	532	4/79
Pumping Plant for Water Control (NO)	533	4/79
Range Planting (AC)	550	10/99
Recreation Area Improvement (AC)	562	6/66
Recreation Land Grading and Shaping (AC)	566	7/89
Recreation Trail and Walkway (FT)	568	7/89
Regulating Water in Drainage Systems (AC)	554	7/89
Residue Management, Mulch-Till (AC)	329-B	7/89
Residue Management, No-Till and Strip-Till (AC)	329-A	12/85
Residue Management, Ridge-Till (AC)	329-C	7/89
Residue Management, Seasonal (AC)	344	2/90
Restoration Management of Declining Habitats (AC)	643	3/99
Riparian Forest Buffer (AC)	391	7/98
Riparian Herbaceous Cover (AC)	390	2/00
Rock Barrier (FT)	555	7/89
Roof Runoff Management (NO)	558	4/87
Row Arrangement (AC)	557	7/89
Runoff Management System (N)andAC)	570	4/87
Sediment Basin (NO)	350	4/79
Shallow Water Management for Wildlife (AC)	646	3/00
Soil Salinity Management-Nonirrigated (AC)	571	1/00
Spoil Spreading (AC)	572	7/89
Spring Development (NO)	574	7/89
Streambank and Shoreline Protection (FT)	580	4/87
Stream Channel Stabilization (FT)	584	7/89
Stripcropping,Contour	585	2/88
Stripcropping, Field (AC)	586	2/88
Structure for Water Control (NO)	587	7/89
Subsurface Drain (FT)	606	4/87
Surface Drainage, Field Ditch (FT)	607	7/89
Surface Drainage, Main or Lateral (FT)	608	7/89
Surface Roughening (AC)	609	7/89
Terrace (FT)	600	4/87
Toxic Salt Reduction (AC)	610	7/83
Tree/Shrub Establishment (AC)	612	3/60
Tree/Shrub Pruning (AC)	660	3/72
Trough or Tank (NO)	614	10/92
Underground Outlet (FT)	620	4/87
Upland Wildlife Habit at Management (AC)	645	2/00
Use Exclusion	472	10/88
Vertical Drain (NO)	630	7/89
Waste Management System (NO)	312	4/87
Waste Storage Facility (NO)	313	3/00
Waste Treatment Lagoon (NO)	359	4/87
Waste Utilization (AC)	633	7/89
Water-Harvesting Catchment (NO)	636	4/87
Waterand Sediment Control Basin (AC)	638	4/87
Waterspreading (AC)	640	7/89
Water Table Control (AC)	641	7/89
Well (NO)	642	6/95

Well Decommissioning (NO)	351	7/99
Wetland Creation	658	3/00
Wetland Enhancement	659	2/00
Wetland Restoration (AC)	657	3/00
Wetland Wildlife Habitat Management (AC)	644	2/00
Wildlife Watering Facility (NO)	648	3/00
Windbreak/Shelterbelt Establishment (FT)	380	2/00
Windbreak/Shelterbelt Renovation (FT)	650	2/00

FT- feet AC-acre NO- number

Montana Conservation Practice Standards are available for public use at local NRCS offices. For more information visit the Montana NRCS website:
http://www.mt.nrcs.usda.gov/pas/fotg/standsmt.html
or call Montana Natural Resources Conservation Service (406) 587-6868.

Appendix C
BEST MANAGEMENT PRACTICES FOR FORESTRY IN MONTANA
December 1997

I. DEFINITIONS

1. "Hazardous or toxic material" means substances which by their nature are dangerous to handle or dispose of, or a potential environmental contaminant, and includes petroleum products, pesticides, herbicides, chemicals, and biological wastes.

2. "Stream," as defined in 77-5-302(7), MCA, means a natural water course of perceptible extent that has a generally sandy or rocky bottom or definite banks and that confines and conducts continuously or intermittently flowing water.

3. "Streamside Management Zone (SMZ)" or "zone" as defined at 77-5-302(8), MCA means "the stream, lake, or other body of water and an adjacent area of varying width where management practices that might affect wildlife habitat or water quality, fish, or other aquatic resources need to be modified." The streamside management zone encompasses a strip at least 50 feet wide on each side of a stream, lake, or other body of water, measured from the ordinary high water mark, and extends beyond the high water mark to include wetlands and areas that provide additional protection in zones with steep slopes or erosive soils.

4. "Wetlands" mean those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, swamps, bogs, and similar areas.

5. Adjacent wetlands are wetlands within or adjoining the SMZ boundary. They are regulated under the SMZ law.

6. Isolated wetlands lie within the area of operation, outside of the SMZ boundary, and are not regulated under the SMZ law.

II. STREAMSIDE MANAGEMENT

The Streamside Management Law (77-5-301 through 307 MCA) provides minimum regulatory standards for forest practices in streamside management zones (SMZ). The "Montana Guide to the Streamside Management Zone & Rules" is an excellent information source describing management opportunities and limitations within SMZs.

III. ROADS

A. Planning and Location

1. Minimize the number of roads constructed in a watershed through comprehensive road planning, recognizing intermingled ownership and foreseeable future uses. Use existing roads, unless use of such roads would cause or aggravate an erosion problem.

2. Review available information and consult with professionals as necessary to help identify erodible soils and unstable areas, and to locate appropriate road surface materials.

3. Fit the road to the topography by locating roads on natural benches and following natural contours. Avoid long, steep road grades and narrow canyons.

4. Locate roads on stable geology, including well-drained soils and rock formations that tend to dip into the slope. Avoid slumps and slide-prone areas characterized by steep slopes, highly weathered bedrock, clay beds, concave slopes, hummocky topography, and rock layers that dip parallel to the slope. Avoid wet areas, including moisture-laden or unstable toe slopes, seeps, wetlands, wet meadows, and natural drainage channels.

5. Minimize the number of stream crossings and choose stable stream crossing sites.

6. Locate roads to provide access to suitable (relatively flat and well-drained) log landing areas to reduce soil disturbance.

B. Design

1. Properly design roads and drainage facilities to prevent potential water quality problems from road construction.

2. Design roads to the minimum standard necessary to accommodate anticipated use and equipment. The need for higher engineering standards can be alleviated through proper road-use management.

3. Design roads to balance cuts and fills or use full bench construction (no fill slope) where stable fill construction is not possible.

4. Design roads to minimize disruption of natural drainage patterns. Vary road grades to reduce concentrated flow in road drainage ditches, culverts, and on fill slopes and road surfaces.

C. Drainage from Road Surface

1. Provide adequate drainage from the surface of all permanent and temporary roads. Use outsloped, insloped or crowned roads, and install proper drainage features. Space road drainage features so peak flow on road surfaces or in ditches will not exceed capacity.

    a. Outsloped roads provide a means of dispersing water in a low-energy flow from the road surface. Outsloped roads are appropriate when fill slopes are stable, drainage will not flow directly into stream channels, and transportation safety can be met.

    b. For in-sloped roads, plan ditch gradients steep enough, generally greater than 2% but less than 8%, to prevent sediment deposition and ditch erosion. The steeper gradients may be suitable for more stable soils; use the lower gradients for less stable soils.

    c. Design and install road surface drainage features at adequate spacing to control erosion; steeper gradients require more frequent drainage features. Properly constructed drain dips can be an economical method of road surface drainage. Construct drain dips deep enough into the subgrade so that traffic will not obliterate them.

2. For ditch relief culverts, construct catch basins with stable side slopes. Protect the inflow end of crossdrain culverts from plugging and armor if in erodible soil. Skew ditch relief culverts 20 to 30 degrees toward the inflow from the ditch to help maintain proper function.

3. Where possible, install culverts at the gradient of the original ground slope; otherwise, armor outlets with rock or anchor downspouts to carry water safely across the fill slope.

4. Provide energy dissipaters (rock piles, slash, log chunks, etc.) where necessary to reduce erosion at outlet of drainage features. Crossdrains, culverts, water bars, dips, and other drainage structures should not discharge onto erodible soils or fill slopes without outfall protection.

5. Prevent downslope movement of sediment by using sediment catch basins, drop inlets, changes in road grade, headwalls, or recessed cut slopes.

6. Route road drainage through adequate filtration zones or other sediment-settling structures to ensure sediment doesn t reach surface water. Install road drainage features above stream crossings to route discharge into filtration zones before entering a stream.

D. Construction (see also Section IV on stream crossings)

1. Keep slope stabilization, erosion and sediment control work current with road construction. Install drainage features as part of the construction process, ensuring that drainage structures are fully functional. Complete or stabilize road sections within same operating season.

2. Stabilize erodible, exposed soils by seeding, compacting, riprapping, benching, mulching, or other suitable means.

3. At the toe of potentially erodible fill slopes, particularly near stream channels, pile slash in a row parallel to the road to trap sediment. When done concurrently with road construction, this is one method that can effectively control sediment movement, and it can also provide an economical way of disposing of roadway slash. Limit the height, width and length of "slash filter windrows" so wildlife movement is not impeded. Sediment fabric fences or other methods may be used if effective.

4. Minimize earthmoving activities when soils appear excessively wet. Do not disturb roadside vegetation more than necessary to maintain slope stability and to serve traffic needs.

5. Construct cut and fill slopes at stable angles to prevent sloughing and other subsequent erosion.

6. Avoid incorporating potentially unstable woody debris in the fill portion of the road prism. Where possible, leave existing rooted trees or shrubs at the toe of the fill slope to stabilize the fill.

7. Consider road surfacing to minimize erosion.

8. Place debris, overburden, and other waste materials associated with construction and maintenance activities in a location to avoid entry into streams. Include these waste areas in soil stabilization planning for the road.

9. Minimize sediment production from borrow pits and gravel sources through proper location, development and reclamation.

10. When using existing roads, reconstruct only to the extent necessary to provide adequate drainage and safety; avoid disturbing stable road surfaces. Prior to reconstruction of existing roads within the SMZ, refer to the SMZ law. Consider abandoning existing roads when their use would aggravate erosion.

E. Maintenance

1. Grade road surfaces only as often as necessary to maintain a stable running surface and adequate surface drainage.

2. Maintain erosion control features through periodic inspection and maintenance, including cleaning dips and crossdrains, repairing ditches, marking culvert inlets to aid in location, and clearing debris from culverts.

3. Avoid cutting the toe of cut slopes when grading roads, pulling ditches, or plowing snow.

4. When plowing snow, provide breaks in snow berm to allow road drainage.

5. Haul all excess material removed by maintenance operations to safe disposal sites and stabilize these sites to prevent erosion. Avoid sidecasting in locations where erosion will carry materials into a stream.

6. Avoid using roads during wet periods if such use would likely damage the road drainage features. Consider gates, barricades or signs to limit use of roads during spring break up or other wet periods.

7. Upon completion of seasonal operations, ensure that drainage features are fully functional. The road surface should be crowned, outsloped, insloped, or water-barred. Remove berms from the outside edge where runoff is channeled.

8. Leave abandoned roads in a condition that provides adequate drainage without further maintenance. Close these roads to traffic; reseed and/or scarify; and, if necessary, recontour and provide water bars or drain dips.

IV. TIMBER HARVESTING, AND SITE PREPARATION

A. Harvest Design

1. Plan timber harvest in consideration of your management objectives and the following:

    a. Soils and erosion hazard identification.

b. Rainfall.
c. Topography.
d. Silvicultural objectives.
e. Critical components (aspect, water courses, landform, etc.).
f. Habitat types.
g. Potential effects on water quality and beneficial water uses.
h. Watershed condition and cumulative effects of multiple timber management activities on water yield and sediment production.
i. Wildlife habitat.

2. Use the logging system that best fits the topography, soil type, and season, while minimizing soil disturbance and economically accomplishing silvicultural objectives.

3. Use the economically feasible yarding system that will minimize road densities.

4. Design and locate skid trails and skidding operations to minimize soil disturbance. Using designated skid trails is one means of limiting site disturbance and soil compaction. Consider the potential for erosion and possible alternative yarding systems prior to planning tractor skidding on steep or unstable slopes.

5. Locate skid trails to avoid concentrating runoff and provide breaks in grade. Locate skid trails and landings away from natural drainage systems and divert runoff to stable areas. Limit the grade of constructed skid trails on geologically unstable, saturated, highly erosive, or easily compacted soils to a maximum of 30%. Use mitigating measures, such as water bars and grass seeding, to reduce erosion on skid trails.

6. Minimize the size and number of landings to accommodate safe, economical operation. Avoid locating landings that require skidding across drainage bottoms.

B. <u>Other Harvesting Activities</u>

1. Tractor skid where compaction, displacement, and erosion will be minimized. Avoid tractor or wheeled skidding on unstable, wet, or easily compacted soils and on slopes that exceed 40% unless operation can be conducted without causing excessive erosion. Avoid skidding with the blade lowered. Suspend leading ends of logs during skidding whenever possible.

2. Avoid operation of wheeled or tracked equipment within isolated wetlands, except when the ground is frozen (see Section VI on winter logging).

3. Use directional felling or alternative skidding systems for harvest operations in isolated wetlands.

4. For each landing, provide and maintain a drainage system to control the dispersal of water and to prevent sediment from entering streams.

5. Insure adequate drainage on skid trails to prevent erosion. On gentle slopes with slight disturbance, a light ground cover of slash, mulch or seed may be sufficient. Appropriate spacing between water bars is dependent on the soil type and slope of the skid trails. Timely implementation is important.

6. When existing vegetation is inadequate to prevent accelerated erosion, apply seed or construct water bars before the next growing season on skid trails, landings and fire trails. A light ground cover of slash or mulch will retard erosion.

C. Slash Treatment and Site Preparation

1. Rapid reforestation of harvested areas is encouraged to reestablish protective vegetation.

2. When piling slash, care should be taken to preserve the surface soil horizon by using appropriate techniques and equipment. Avoid use of dozers with angle blades.

3. Minimize or eliminate elongated exposure of soils up and down the slope during mechanical scarification.

4. Scarify the soil only to the extent necessary to meet the resource management objectives. Some slash and small brush should be left to slow surface runoff, return soil nutrients, and provide shade for seedlings.

5. Carry out brush piling and scarification when soils are frozen or dry enough to minimize compaction and displacement.

6. Carry out scarification on steep slopes in a manner that minimizes erosion. Broadcast burning and/or herbicide application is preferred means for site preparation, especially on slopes greater than 40%.

7. Remove all logging machinery debris to proper disposal site.

8. Limit water quality impacts of prescribed fire by constructing water bars in firelines; not placing slash in drainage features and avoiding intense fires

unless needed to meet silvicultural goals. Avoid slash piles in the SMZ when using existing roads for landings.

V. STREAM CROSSINGS

A. Legal Requirements

1. Under the Natural Streambed and Land Preservation Act of 1975 (the "310 law"), any activity that would result in physical alteration or modification of a perennial stream, its bed or immediate banks must be approved in advance by the supervisors of the local conservation district. Permanent or temporary stream crossing structures, fords, riprapping or other bank stabilization measures, and culvert installations on perennial streams are some of the forestry-related projects subject to 310 permits.

   Before beginning such a project, the operator must submit a permit application to the conservation district indicating the location, description, and project plans. The evaluation generally includes on-site review, and the permitting process may take up to 60 days.

2. Stream-crossing projects initiated by federal, state or local agencies are subject to approval under the "124 permit" process (administered by the Department of Fish, Wildlife and Parks), rather than the 310 permit.

3. A short-term exemption (3a authorization) from water quality standards is necessary unless waived by the Department of Fish, Wildlife and Parks as a condition of a 310 or 124 permit. Contact the Department of Environmental Quality in Helena at 444-2406 for additional information.

B. Design Considerations (Note: 310 permit required for perennial streams)

1. Cross streams at right angles to the main channel if practical. Adjust the road grade to avoid the concentration of road drainage to stream crossings. Direct drainage flows away from the stream crossing site or into an adequate filter.

2. Avoid unimproved stream crossings. When a culvert or bridge is not feasible, locate drive-throughs on a stable, rocky portion of the stream channel.

C. Installation of Stream Crossings (Note: 310 permit required for perennial streams)

1. Minimize stream channel disturbances and related sediment problems during construction of road and installation of stream crossing structures. Do not place erodible material into stream channels. Remove stockpiled material from

high water zones. Locate temporary construction bypass roads in locations where the stream course will have minimal disturbance. Time construction activities to protect fisheries and water quality.

2. When using culverts to cross small streams, install those culverts to conform to the natural stream bed and slope on all perennial streams and on intermittent streams that support fish or that provides seasonal fish passage. Ensure fish movement is not impeded. Place culverts slightly below normal stream grade to avoid culvert outfall barriers. Do not alter stream channels upstream from culverts, unless necessary to protect fill or to prevent culvert blockage.

3. Design stream-crossings for adequate passage of fish (if present), minimum impact on water quality, and at a minimum, the 25-year frequency runoff. Consider oversized pipe when debris loading may pose problems. Ensure sizing provides adequate length to allow for depth of road fill.

4. Install culverts to prevent erosion of fill. Compact the fill material to prevent seepage and failure. Armor the inlet and/or outlet with rock or other suitable material where feasible.

5. Consider dewatering stream crossing sites during culvert installation.

6. Maintain a 1-foot minimum cover for culverts 15 to 36 inches in diameter, and a cover of one-third diameter for larger culverts, to prevent crushing by traffic.

7. Use culverts with a minimum diameter of 15 inches for permanent stream crossings and cross drains.

VI. Winter Logging

A. General

1. Consider snow-road construction and winter harvesting in isolated wetlands and other areas with high water tables or soil erosion and compaction hazards.

2. Conduct winter logging operations when the ground is frozen or snow cover is adequate (generally more than one foot) to prevent rutting or displacement of soil. Be prepared to suspend operations if conditions change rapidly, and when the erosion hazard becomes high.

3. Consult with operators experienced in winter logging techniques.

B. Road Construction and Harvesting Considerations

1. For road systems across areas of poor bearing capacity, consider hauling only during frozen periods. During cold weather, plow any snow cover off of the roadway to facilitate deep freezing of the road grade prior to hauling.

2. Before logging, mark existing culvert locations. During and after logging, make sure that all culverts and ditches are open and functional.

3. Use compacted snow for road beds in unroaded, wet or sensitive sites. Construct snow roads for single-entry harvests or for temporary roads.

4. In wet, unfrozen soil areas, use tractors or skidders to compact the snow for skid road locations only when adequate snow depth exists. Avoid steeper areas where frozen skid trails may be subject to erosion the next spring.

5. Return the following summer and build erosion barriers on any trails that are steep enough to erode.

VII. HAZARDOUS SUBSTANCES

A. General

1. Know and comply with regulations governing the storage, handling, application (including licensing of applicators), and disposal of hazardous substances. Follow all label instructions.

2. Develop a contingency plan for hazardous substance spills, including cleanup procedures and notification of the State Department of Environmental Quality.

B. Pesticides and Herbicides

1. Use an integrated approach to weed and pest control, including manual, biological, mechanical, preventive and chemical means.

2. To enhance effectiveness and prevent transport into streams, apply chemicals during appropriate weather conditions (generally calm and dry) and during the optimum time for control of the target pest or weed.

APPENDIX E
Montana DEQ Nonpoint Source Program Projects

Date	
2000	Office of the Governor: Flathead Basin Buffer Zone & Water Quality Improvement Demonstration Project
2000	Montana Natural History Center: Community Education & Citizen Monitoring in Middle Clark Fork Watershed
2000	Montana State University: Volunteer Water Monitoring Project
2000	Montana State University: Watershed WEB Information Network
2000	Park Conservation District: Upper Yellowstone River Corridor Management Plan
2000	Montana Rural Water System: Source-water Protection Education as a Watershed Management Tool in Upper Musselshell
2000	Green Mountain Conservation District: Bull, Rock, Whitepine, Prospect, & Elk Creeks Project
2000	Fish, Wildlife & Parks: Lost Creek Watershed Project
2000	Park County: Impacts of Nonpoint Source Pollution on Water Resources in the Paradise Valley
2000	Gallatin Conservation Contractor: Lower Gallatin River Composting & Manure Management Demonstration & Education Project
2000	Liberty County Conservation District: Saline Seep Reclamation & Irrigation Water BMP
2000	Cascade County Conservation District: Adobe Creek Basin Project:
2000	Lower Musselshell Conservation District: Painted Robe Watershed Project
2000	Little Blackfoot TMDL: Deer Lodge Valley Conservation District
2000	Ravallii County: Bitterroot River TMDL
2000	Park Conservation District: Upper Shields Watershed Improvement Project:
1999	Buffalo Rapids Irrigation District: Yellowstone River O'Fallon Creek Projects
1999	DNRC - Forestry Division: Forestry BMP Implementation Audits
1999	Fergus Conservation District: Central Montana/Judith Basin Big Spring Creek Project
1999	Green Mountain Conservation District: Prospect Creek Watershed Project
1999	Lower Musselshell Conservation District: Careless Creek Watershed Project
1999	Missoula Valley Water Quality District: Performance Evaluation of a Passive Denitrifying Septic Drainfield
1999	Montana Association of Conservation Districts: Watershed Education Project Adult/Students Conservation Youth Camps
1999	Montana Watercourse: Volunteer Water Quality Monitoring
1999	Montana Watercourse: Watershed Education for Reduced NPS Pollution
1999	MSU Department of Animal and Range Science: Grazing BMP Demonstration Project
1999	Natural Resource Information System NRIS: Utilization of TMDL Software Applications
1999	North Powell Conservation District: Lower Nevada Creek Watershed Project Phase II
1999	Park Conservation District: Geomorphology and Historical Changes to the Upper Yellowstone River
1999	Petroleum County Conservation District: Lower Musselshell River Watershed Project
1999	UM/RWRP School of Forestry: Montana Grazing BMP Assessment/WQ Monitoring
1998	Clean Water Action Plan: Assessment of Montana's Watershed Restoration Needs

Date	
1998	Gallatin Conservation District: Assessment of Septics Contamination on Groundwater and Impaired Surface Waters
1998	DNRC: Montana Forestry Best Management Practices Monitoring
1998 (revised)	Montana Stream Management Guide for Landowners, Managers and Stream Users
1998	Rosebud Conservation District: Rosebud and E. Armells Creek NPS Coal Mining Impacts
1998	Successful Strategies for Grazing Cattle in Riparian Zones
1998	Teton Conservation District: Teton Watershed Project
1998	Yellowstone Conservation District: Canyon Creek/West Billings Project
1997	A Landowner's Guide to Montana Wetlands
1997	Bitterroot Conservation District: Bitterroot Watershed Project
1997	Broadwater Conservation District: Deep Creek Watershed
1997	Cascade Conservation District: Sun River Watershed
1997	Flathead Conservation District: Lake Water Quality and Shoreline Protection
1997	Green Mountain Conservation District: Elk Creek Watershed Demo Project and District-wide Capacity Building Project
1997	Judith Basin Conservation District: Big Otter Creek
1997	Land and Water Management for Small Farm and Ranches in Montana
1997	MSU/Lewis & Clark Conservation District: Project WET - NPS Youth Education
1997	Ruby Valley Conservation District: Ruby River Watershed
1997	Teton Conservation District: Pesticides in Groundwater on Greenfield Bench
1996	Central RC&D and Department of Natural Resources: Teacher Minigrants
1996	EPA: Muddy Creek Monitoring
1996	Published Guide to Animal Waste Management and Water Quality Protection in Montana
1995	Musselshell Conservation District: Careless Creek
1995	North Powell Conservation District: Nevada Creek
1995	Sun River/Fort Shaw
1996	Deep Creek TMDL Implementation
1996	Bitterroot Watershed– Phase II
1996	Grazing BMPS Demonstration Project
1996	Cascade Co. Lower River Road GW Assessment
1996	AgriMet Irrigation Water Management
1996	Vegetative Filter Strip BMP Demo –MSU
1996	MT Watercourse Teacher Education Project WET
1996	Forestry BMP Audits DNRC
1995	Tri State Council Implementation
1995	Lewis and Clark County TMDL
1995	BLM / UM Grazing BMP Study
1995	Well Abandonment – Northeast MT – Roosevelt CD
1995	Red River Groundwater Assessment
1995	Lake Creek Watershed Project

Date	
1995	Big Spring Creek Watershed Project
1994	Bullhead Water Quality – Implementation
1994	Muddy Creek Project
1994	Flaxville Aquifer Project – Fort Peck Reservation
1994	Project WET – Teacher education
1994	Animal Waste Guidebook
1994	Applied Fluvial Morphology Training
1994	Conservation District Capacity Building
1994	Blackfoot Executive Director Funding
1994	EPA Section 319 Success Stories
1994	Flathead Groundwater Carrying Capacity
1994	Montana Guide to the Streamside Management Zone Law and Rules
1994	Riparian Forest Stewardship
1993	Big Otter Creek Watershed Project
1993	Otter Creek Watershed Project
1993	Groundwater Assessment – Animal confinements
1991	Montana Forestry Best Management Practices: Forest Stewardship Guidelines for Water Quality